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FORMERLY

AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Assn.)

EDITED AND PUBLISHED FOR

The American Veterinary Medical Association

CONTENTS

Editorial 1
Coming Veterinary Meetings 7
Papers:
Some Suggestions for Financing and Promoting Veterinary Education in America—Ward Giltner 8
The Teaching of Veterinary Medicine to Agricultural Students—J. F. Shigley 16
The Veterinarian and Extension Work—Don McMahan 24
Experiments on Lowering the Cost of Vaccinating Against Hog Cholera—James W. Benner 29
Bovine Infectious Abortion—Prevention and Control—M. F. Barnes 54
Some Problems for the Veterinarian—Veranus A. Moore 75
The California and Texas Foot-and-Mouth Disease Outbreaks—J. R. Mohler 84
The Effect of Cod Liver Oil on Dogs Convalescing from Distemper—A. S. Schlingman 91
Some Veterinary Reminiscences, VIII—N. S. Mayo 97
Clinical and Case Reports:
Diabetes in a Pig Showing Pancreatic Lesions—H. E. Biester 99
Reviews 110
Abstracts 111
Army Veterinary Service 113
Association Meetings 115
Necrology 132
Personals 135

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A PROBLEM IN ECONOMICS

A veterinary education now costs, on a time basis alone, from two to three times as much as it did twenty years ago. If we assume that living expenses have doubled during that time, then a veterinary education now costs from four to six times as much as it did before. A recognized authority recently put the cost of a college education at five thousand dollars and four years time.

With regard to the expense of conducting an established practice under present-day conditions, a conservative estimate would be three times what it cost to do the same volume of business twenty years ago, considering the increased costs of drugs, instruments, transportation and overhead.

While these increases in disbursements have been taking place, what has happened on the other side of the ledger? How much more per visit are you receiving? Very few veterinarians can say that they are getting even double what they got ten, or even twenty years ago. The same is true of the fees for special services, such as operations, consultations, etc.

What is the solution for this difficult problem in economics? We do not like to prescribe longer hours. The practicing veterinarian probably puts in more hours per day than most professional men. If the veterinarian is to increase his income, and do

this without unduly lengthening his working day, he has just two outlets. One is to increase his number of calls or services rendered and the other is to increase his charges for each service.

No one cares to increase fees. It goes against the grain. If you have been doing work for a client, year in and year out, at a fairly regular schedule of fees, it takes courage to increase these charges. And yet it is nothing but good business to do so. Your client is paying more for everything else he buys. Why should he not pay more for his veterinary services? There is considerable evidence to indicate that he is paying more, when he has to, but at the same time many clients have been trying to get along with less services.

The charges of profiteering which have been made against the veterinary profession have been based on the indiscreet acts of a very small number of men in the profession, who tried to make killings at hog vaccination. It is useless to deny that there have been such cases. It can be stated, too, without fear of contradiction, that these charges in no case have been directed against veterinarians who moderately increased their fees, in tune with the times.

In the case of the veterinarian whose practice consists largely or exclusively of administering to utility or food-producing animals—horses, cattle, sheep and swine—there is a limit beyond which he can not go, in making his charges. The animals he treats have a market value, and these are not sold by the producer at a price based upon the cost of production, except, perhaps, in the case of a few pure-bred animals.

It would appear, then, from an analysis of the conditions existing at present, that a veterinarian would do well to enlarge his sphere of usefulness. He must continually be on the alert and abreast of the times. He must be able to perform every veterinary service, no matter now simple it may be, better than any layman can do it or better than any county agent, farm advisor, farmer or stockman can do it. As we have said before, unless he can do his work better, in a more scientific and professional way, there is no real advantage to the live stock owner in employing veterinary services.

The only other serious encroachment on veterinary practice, at the present time, is state medicine. Here it is not a question of whether a veterinarian or somebody else is best qualified to perform certain veterinary services, but rather a question as

to whether such services should be performed by a private veterinarian, or his colleague in the employ of the state or federal government. A veterinarian who is a private practitioner today will be no better qualified tomorrow, just because he deserts private practice to accept a state or federal position.

The disquieting feature of so-called state medicine, as we have seen it thus far, is the discouraging influence it has had on the men in private practice. Whether this will be carried to the point where large territories will be deprived of the services of private practitioners, for handling those diseases with which "official" veterinarians are not concerned, remains to be seen.

Quoting Dean Moore, a veterinarian nowadays must do more than "tinker" with the sick and injured animals that are brought to him. He can and must create for himself a different place than he has occupied in the public eye heretofore.

After all, it reverts largely to the individual. There are veterinarians in practice today who have all they can do most of the time. They do not have time to complain. They are busy because they do their work well and because their clients have found that it is economical and advantageous to employ their services. Owners of live stock will be just as quick to recognize value received as anybody else, and they will not hesitate to pass the word along, that Dr. So-and-so is a first-class, up-to-date veterinarian. And the good doctor himself will not have to do any worrying about advertising, either.

It therefore behooves every veterinarian to shake loose his air of smug complacency, if he has one, and take advantage of every opportunity that is offered for self-improvement. He should attend the meetings of his local and state associations regularly, and those of the A. V. M. A. just as often as he can. He should read his veterinary journals, bulletins and other scientific publications, including every new textbook. There are not too many of the latter for every veterinarian to have a complete and up-to-date library. Every veterinarian should be constantly actuated by a desire to improve himself and his methods. If he does this, he will be repaid. If he does not, he will get in a rut so deep that he will be unable to see over the edges. We have made a few simple suggestions. We believe they are sound and will prove helpful if adopted.

EXECUTIVE BOARD ELECTION

Members in Executive Board District No. 5 are now voting for their representative on the Board, for the five-year term beginning with close of the Portland meeting. The ballots were mailed on March 2, and at this writing, two weeks later, a trifle over fifty per cent of the ballots have been returned.

It is interesting to note that four of the five members nominated are among the five who were nominated for the same office five years ago, Drs. Cotton, Crewe, Fitch and Stange. Dr. B. T. Simms is a nominee this year, replacing Dr. W. T. Spencer, who was a candidate in the previous election. The nominees this time are:

COTTON, C. E. — Minneapolis, Minnesota
Secretary and Executive Officer, Minnesota State Live Stock Sanitary Board. Graduate, University of Pennsylvania, 1893. Joined A. V. M. A., 1898. President, 1916-1917. Member of Executive Board, 1920-1925.

CREWE, W. F. — Bismarck, North Dakota
State Veterinarian of North Dakota. Graduate, Ontario Veterinary College, 1891. Joined A. V. M. A., 1893. Resident Secretary for North Dakota, 1902-1903 and 1910-1915.

FITCH, C. P. — St. Paul, Minnesota
Chief, Division of Veterinary Medicine, University of Minnesota. Graduate, New York State Veterinary College at Cornell University, 1911. Joined A. V. M. A., 1912. Resident Secretary for Minnesota, 1918-1919. Chairman, Committee on Abortion, 1919-1925.

SIMMS, B. T. — Corvallis, Oregon
Professor of Veterinary Science, Oregon Agricultural College. Graduate, Alabama Polytechnic Institute, 1911. Joined A. V. M. A. 1912. Resident Secretary for Oregon, 1916-1924. Committee on Intelligence and Education, 1919-1925.

STANGE, C. H. — Ames, Iowa
Dean, Division of Veterinary Medicine, Iowa State College. Graduate, Iowa State College, 1907. Joined A. V. M. A., 1907. Member of Executive Board, 1916-1920. President, 1923-1924.

Although the polls will remain open until May 15, to allow time for the ballots of our Philippine members to be returned, this is no reason for delaying *your* vote if you are located in one of the states comprising District No. 5.

PLANS FOR PORTLAND

The place: Portland, Oregon.
The time: July 21-22-23-24, 1925.
Headquarters: Multnomah Hotel.
Official route: Burlington-Great Northern.

ANONYMOUS COMMUNICATIONS

Occasionally we receive an anonymous letter. In the majority of cases these letters contain complaints, very often registered against some fellow veterinarian. We take this opportunity to call attention to the fact that absolutely no attention of any kind whatsoever will be paid to such anonymous communications. Unless the writer is man enough to sign his name to the letter, we will not consider it of sufficient importance to warrant any attention upon our part.

U. S. LIVE STOCK SANITARY ASSOCIATION PROCEEDINGS AVAILABLE

The report of the 28th annual meeting of the U. S. Live Stock Sanitary Association, held at Chicago, Ill., December 3-4-5, 1924, is now available in published form. Copies of the proceedings may be secured from the secretary, Dr. O. E. Dyson, 923 Live Stock Exchange Bldg., Kansas City, Mo., at $2.00 per copy. This valuable report should be in the hands of every veterinarian, as it contains a great deal of very valuable material which is not published elsewhere.

APPLICATIONS FOR MEMBERSHIP

In the October, 1924, issue of the JOURNAL, announcement was made of the new manner in which applications for membership are now being handled. Section 6 of Article 2—Application for Membership—as amended, was quoted as follows:

> Applications for membership shall be made upon blanks furnished by the Association, in the handwriting of the applicant, and must be endorsed by two members of the Association in good standing, one of whom must be a resident of the state, province, or territory in which the applicant resides. Applications must be accompanied by the membership fee of $5.00 and dues pro rata for the balance of the fiscal year current, as stated on the application blank. Applications must be filed with the Secretary and be examined by him for correctness as far as available information will allow. After such approval by the Secretary, the latter will cause to be published in the official JOURNAL, as soon thereafter as possible, said application with name and address of applicant, college, and year of graduation, and names of vouchers. If no objections shall be filed with the Secretary, as against the applicant being admitted to membership in the Association, his name shall again be listed in the next issue of the JOURNAL, and if no objections shall have been filed within thirty days after the second publication of the name of the applicant, he shall automatically become a member and shall be so enrolled by the Secretary, and membership card issued. If any objections be filed against any applicant, either on first or second notice, said application will be referred to the Executive Board for consideration.

The new system has now been in operation for over six months and is working smoothly. Since the meeting in Des Moines, 44

applications for membership have been received and posted in the JOURNAL in accordance with the amendment adopted at the 1924 meeting. By the time this number of the JOURNAL is in the hands of our members, 26 of these 44 applicants will have completed their applications and be in possession of their membership cards. This month we are giving the first listing to 10 applications, the largest number received during any one month since the new plan has been in operation. Considerable interest is manifest in the Northwest, evidenced by the number of applications for membership being announced from that territory this month. If you know of some veterinarian who is not a member of the A. V. M. A., forward his name to your Resident Secretary, who is prepared to give full information concerning membership.

FIRST LISTING

BROWN, HARRY W. 415 E. 7th St., Portland, Ore.
D. V. M., Indiana Veterinary College, 1923
Vouchers: Thomas B. Carter and G. H. Huthman

FOSTER, ROBERT S. 825 Williams Ave., Portland, Ore.
B. V. Sc., Ontario Veterinary College, 1922
Vouchers: Thomas B. Carter and Horst Schreck

GRAHAM, PERCY Red Springs, N. C.
D. V. M., U. S. College of Veterinary Surgeons, 1918
Vouchers: John I. Handley and J. P. Spoon

LOWE, O. E. Charlottsville, Ind.
D. V. M., Indiana Veterinary College, 1912
Vouchers: C. C. Donelson and R. C. Julien

NICOL, RAYMOND J. 417 So. B. St., McMinnville, Ore.
D. V. M., San Francisco Veterinary College, 1918
Vouchers: Thomas B. Carter and G. H. Huthman

ROHNER, JOSEPH E. 3rd and Jackson Sts., Corvallis, Ore.
D. V. M., St. Joseph Veterinary College, 1920
Vouchers: Thomas B. Carter and B. T. Simms

ROWSON, ALBERT EDGAR Drumheller, Alta., Canada
B. V. Sc., Ontario Veterinary College, 1918
Vouchers: J. C. Hargrave and A. M. McKay

RUEHLE, OTTO 825 Williams Ave., Portland, Ore.
D. V. M., Cornell University, 1922
Vouchers: Thomas B. Carter and Horst Schreck

SCHMIDT, FREDERICK CARL 13th and Couch Sts., Portland, Ore.
B. V. Sc., Ontario Veterinary College, 1921
Vouchers: Thomas B. Carter and Horst Schreck

WOOD, FRED DICKSON 39th St. and Woodland Ave., Philadelphia, Pa.
V. M. D., University of Pennsylvania, 1924
Vouchers: C. J. Marshall and G. A. Dick

Applications Pending

SECOND LISTING

Barber, Joseph Squire, Princeton, Iowa.
Freer, C. B., 17 Park St., Ellenville, N. Y.
Hanson, Carl, Faribault, Minn.
Holmgren, Walter Frank, Lake Benton, Minn.
Santamaria, Serafin, Army Medical School, Washington, D. C.
Siemer, C. E., Barnum, Minn.

COMING VETERINARY MEETINGS

Southeastern Michigan Veterinary Medical Association. Detroit, Mich. Apr. 8, 1925. Dr. H. Preston Hoskins, Secretary, 735 Book Bldg., Detroit, Mich.

Maine Veterinary Medical Association. Congress Square Hotel, Portland, Me. Apr. 8, 1925. Dr. A. J. Neal, Secretary, Bangor, Me.

Conestoga Veterinary Club. Stevens House, Lancaster, Pa. Apr. 9, 1925. Dr. Henry S. Weber, Secretary, 27 E. Liberty St., Lancaster, Pa.

Capitol Veterinary Medical Association. Lansing, Mich. Apr. 16, 1925. Dr. A. E. Erickson, Secretary, Charlotte, Mich.

Massachusetts Veterinary Association. American House, Boston, Mass. Apr. 29, 1925. Dr. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.

Louisiana State Veterinary Medical Association. City Hall Auditorium, Alexandria, La. May 6-7, 1925. Dr. L. H. Bennett, Secretary, Monroe, La.

Michigan-Ohio Veterinary Medical Association. May 7, 1925. Adrian, Mich. Dr. W. E. Watson, Secretary, Metamora, Ohio.

National Association of B. A. I. Veterinarians—Mississippi Valley Division. St. Louis, Mo. May 9, 1925. Dr. R. E. Surring, Secretary, National Stock Yards, Ill.

Central Michigan Veterinary Medical Association. Jackson, Mich. May 28, 1925. Dr. W. N. Armstrong, Secretary, Concord, Mich.

Missouri Veterinary Medical Association. Excelsior Springs, Mo. June 8-9-10. 1925. Dr. Fred C. Cater, Secretary, Sedalia, Mo.

Kentucky Veterinary Medical Association. Glasgow, Ky. July 8-9, 1925. Dr. J. A. Winkler, Secretary, Newport, Ky.

Illinois State Veterinary Medical Association. Peoria, Ill. July 8-9, 1925. Dr. L. A. Merillat, Secretary, 1827 So. Wabash Ave., Chicago, Ill.

Virginia State Veterinary Medical Association. Charlottesville, Va. July 9-10, 1925. Dr. W. H. Ellett, Secretary, Medlothian, Va.

Missouri Valley Veterinary Association. Omaha, Nebr. July 13-14-15, 1925. Dr. E. R. Steel, Secretary, Grundy Center, Iowa.

SOME SUGGESTIONS FOR FINANCING AND PROMOTING VETERINARY EDUCATION IN AMERICA[1]

By WARD GILTNER, *East Lansing, Michigan*

Dean, Division of Veterinary Science, Michigan Agricultural College

Every profession exists because of a need and a demand for the services of well-trained and highly educated men of character and energy in some special field of human endeavor. The veterinary profession is no exception. All animals, whether domesticated or not, in the nature of things, suffer ailments or are subjected to treatments demanding intervention by those specially qualified. These services are rendered because of economic considerations or for humanitarian or sentimental reasons. Certain aspects of the human health problem demand consideration by those trained to recognize and combat animal diseases of an intercommunicable nature and not adequately studied by the human medical profession. Hence the veterinary profession. It has developed to meet certain deep-seated needs.

We have been for some time, are now, and will be for an indefinite future, living in a mechanical age. Such a statement is only relative and means only that there is a more universal, widely dispersed employment of mechanical devices for more purposes in this age than previously. It does not mean that mechanical agencies have completely replaced other media— biological or vital— of expression, or service. It seems to have resulted in a temporary, if not permanent, disturbance in the relative position of animate life in our scheme of things, in some important instances in relegating to a subsidiary role certain species, the draft animals in particular. A readjustment is quite probable in those instances where this relative position has been unwisely upset. The new agency may not replace but eventually only supplement the old. Certainly there are very sharp limitations, naturally, on the ultimate extent and nature of substitution of inanimate mechanical appliances for living organisms.

Statistics show very clearly, as does pure reason, that animals are not disappearing from America or the civilized world, but that they are increasing as the human population increases, and, if not proportionately, their failure to increase at the same rate

[1]Presented at the sixty-first annual meeting o the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924.

is looked upon as an indication of economic distress. Hence, if they are not increasing *pari passu* with the increase in human population, a problem is thereby created only to be recognized with the obvious result that steps will be taken to correct the evil. It is clear, therefore, that the raw material upon which the veterinary profession works is not destined to disappear. The defects and diseases of this raw material, also, are not disappearing. They are natural, recurring phenomena, and must be met boldly and intelligently from day to day. Furthermore, there is no substitute for veterinary science and its practice. There may be other vehicles than the veterinary profession, but there is no other road on which they may travel. Those who know the true worth of the veterinary profession will not admit that ox-carts and wheel-barrows of quackery—home remedies, correspondence school products, etc., *ad nauseam*—can take the place of the modern twin-sixes or trucks of well educated and thoroughly trained veterinary science.

Supply and Demand

The veterinary profession is based on the men who practice it or otherwise contribute to it or draw upon it. The modern method of preparing these men is well known to all. It consists in a fairly rigid selection on an educational basis, followed by a full college course, usually admitted to be as severe as, if not more exacting than, other courses in a university. As in all professional and other phases of industrial life, there is a constant flow of men into, through, and out of the profession. The data at hand, widely published in both professional and lay press, indicate a peculiar situation as respects this flow. Let us assume that the profession constitutes a great reservoir, the contents of which should, because of the work to be performed, remain constant, or at least should not diminish. The facts are that the effluent from this reservoir exceeds, by four hundred per cent, the affluent to it. In other words, about five hundred men are leaving the profession each year, with only about that number in all our veterinary colleges, not more than twenty-five per cent of whom can be released to enter the profession annually. It would seem that no interpretation of these figures could be distorted into a defense of the view that there are too many men in our veterinary colleges, or that there are too many colleges, since their number has been decreased by over fifty per cent in the last few years. Certainly there is no demand for

the establishment of additional veterinary colleges at the present time. Possibly some of those now in operation are not worthy or capable of continued existence. Time will tell.

The eleven veterinary colleges now in operation are located fairly strategically in as many different states and must serve forty-eight states and the federal government itself. Their average enrollment is too small to make class-work either effective or economic. Some of them approach a condition of congestion, with the attendant evil of inefficiency. The very best of them does not (or do not) boast of being adequately equipped either in material equipment or staff; the average school should blush to make such a claim and the poorest would appear ridiculous in anything but the most modest role. If we may assume that it is a fair and expedient thing to admit the right of all those schools to strive for a continued existence, we may also assume that additional schools should not be launched until those now in existence have an opportunity to demonstrate their ability adequately to meet the country's needs.

Profession Must Clean House

How are we to effect a flow of young men to our veterinary colleges in such volume that a wise selective policy will ensure the graduation of enough, but not too many, well-qualified, with a negligible number of naturally unfitted and ill-trained, men? It is a fair statement that every high school boy is entitled to know the facts relative to every learned profession, trade, or calling, so that he may decide deliberately and wisely on the course to pursue. All thinking persons, inside or outside the schools, should be informed as to the true position of the veterinarian in our social scheme, in order that prejudice may be dispelled and replaced by sympathy. Veterinary education must come to stand before the public as education in its best and truest sense, and veterinary practice as a noble and indispensable art firmly grounded in science. The profession itself must be purged of its own disloyal and discontented elements, the former by personal retirement and the latter by removal of the causes of discontent, which can be best accomplished by causing our veterinary colleges to serve not only the undergraduate but also, and particularly, the graduate, thus enabling him adequately to serve his clients. Our veterinary colleges must come to stand for post-graduate instruction. They might well develop along certain special lines based on geographic or other peculiar circumstances.

Efforts on the part of the writer to bring some of these things to pass have convinced him that it is more than a one-man job, and, with every reason to believe that at least ten others better qualified are more effectively engaged in the same efforts, he is convinced that there should be a concerted effort to put across the program. While each institution may undertake to work its one local field, in its own special way, some force will be found, even locally, in the voice of the stranger. The prophet is not without honor except in his own country. When it comes to presenting the case to the thirty-seven states without veterinary colleges, it will be both economically and psychologically more advantageous to let the voice of the profession as a whole speak with force and clarity. Either this Association or veterinary colleges in concert must seriously prepare some statement of our case and see that it is annually placed in the high schools of America.

America Leads in Education

As a result of the World War and for other reasons, American higher education has taken a leading position. Do we not owe it to the world to make American veterinary education so attractive that it will draw its students from the four quarters of the globe? At any rate, the richest live stock country that civilization has known owes it to itself to make its veterinary educational equipment and curriculum superior to that of any other country.

Financing a project of advertising veterinary education might be undertaken jointly by the veterinary colleges, the A. V. M. A., and the several state associations, with the understanding that all should share pro rata in the expense and in the benefits. An impartial, but well-qualified committee might prepare the material for presentation and estimate the expenses and allocate the same amongst the interested parties. It is too big an undertaking for any one organization. Furthermore, it is not the duty of any one but of all. Each would share in the benefits, each should share in the burdens. No one should undertake to preempt the field which belongs to all.

Financing the veterinary schools and the students therein is another vital problem. It is intimately related to that of directing them from the high schools into the veterinary college, although it is a part of the big general problem of meeting the cost of higher education. But may we not do something special

to encourage veterinary students and to promote veterinary education? Is it too much to hope or to expect that private sources may not be found to supplement the state support upon which our few remaining schools depend? We have at least one conspicuous example of an American veterinary college munificently backed by private support and at least another with considerable gifts from private sources. Certainly there are other sources whence support might come, should our case be laid before interested parties. Economic considerations alone should suffice to inspire some financial backing for research if not for the routine work of undergraduate instruction.

But we have not as yet tapped the governmental resources of America. Not even one of the states in which there is a veterinary college can be said to be supporting veterinary education generously. Perhaps it is not too much to say that some of them have unwillingly or unwittingly assumed parentage of an unwelcome, if not almost unknown, child, with the natural and consequent starvation of the progeny. What shall we say of the thirty-seven states that have selfishly or prudently refrained from parenthood? Is there not some legitimate obligation on the part of these states to maintain the profession within their own borders by subsidizing the institutions that are preparing their own sons or others for professional service within that state?

Other States Should Help

An intelligent effort should be made to interest all the states not supporting a veterinary college in contributing to the support of students enrolling in veterinary colleges in other states. Students thus supported might contract to return to the service, private or public, of the home state, for a term of years in consideration of the subsidy. Anyone familiar with the cost of veterinary education can testify to the fact that it would be much cheaper for a state to grant such subsidies than for each state to undertake the maintenance of an adequate veterinary college.

The federal government should also make provision for financially assisting veterinary education. There is no more need for the establishment of a federal veterinary college than there is for the establishment of additional schools, at least for the near future. Funds raised by the federal government belong to the people—the people of all the states. Such funds should

be raised only wisely, but they belong in all cases to the people, and should be returned to the people as nearly directly as possible. It is not only legitimate but right and proper that Congress should appropriate the people's money to support the education by the states of men who are to enter the federal service. Enough men to maintain the army and the other branch of the federal service should thus be supported. In addition, the government of all the people might well undertake to assist in educating, in the various state schools, the students in originating states not electing directly to support a veterinary college.

It would not be asking anything unreasonable to petition Congress for an investment in animal health through veterinary education. It has occurred to me that the federal government might reimburse each state school, say, to the extent of one thousand dollars per annum, *per studentem*, coming to that college from another state. In such cases, the govenment would reserve the right to approve the state school in respect of curriculum, equipment, and personnel.

This Association, through a carefully selected committee, should undertake to develop a plan and push it to a successful operation, whereby the profession it represents may be assured of its self-perpetuation on an increasingly higher plane from year to year. This can be done through veterinary education.

Discussion

Chairman Kernkamp: Dr. Giltner certainly has given us something to think about, and something that has been in the minds of some of us at times when we think about those matters. Thinking especially of the thirty-seven states that do not have a veterinary college, I know, as one of them, we must feel gratified to those who prepare a college for our veterinarians. I think he has opened a field for considerable lively discussion. It may be a little early, but what we begin to think about now will help us a little in the future.

Dr. L. A. Klein: Mr. Chairman, I can confirm Dr. Giltner's conclusions in regard to giving attention to high schools. For a number of years it was our custom to insert a small advertisement in some of the agricultural journals. All of the "ads" were keyed so that each reply received could be traced and I can say without doubt that we never got a single student from the advertisements. Most of the inquiries were in regard to a correspondence course. The "ad" in each paper consisted of only a few lines and only appeared two or three times each year. If the "ad" had been larger or had been run for a longer time better results might have been obtained.

About five years ago we stopped the "ads" and began sending out letters each spring to high school principals, members of the State Breeders' and Dairymen's Association and county farm agents asking them to send in the names and addresses of any high school students or graduates whom they thought would be interested in a course in veterinary medicine, enclosing an addressed post card for that purpose. The response to these letters has been very good. The names of many young men qualified to enter a veterinary school have been sent in and a number of them have entered our school.

I fully agree with Dr. Giltner that it would be a good thing if some system could be worked out whereby the Federal Government could participate in the financial support of veterinary education. In regard to states which do

not maintain veterinary schools, it would be much less expensive, as Dr. Giltner stated, for them to send their young men who desire to take a veterinary course to one of the existing schools and pay the full cost of their education than to establish schools of their own.

Until the session just closed every student attending our school paid the same tuition fee, namely $150, those from Pennsylvania as well as those from other states, but in passing our appropriation bill last year the Legislature inserted a provision that we should give tuition free to residents of the State. This state appropriation only covered about one-half of our expenses, the balance being covered by income from endowment, students' charges and hospital fees. Our school has an endowment fund of $150,000. Again confirming Dr. Giltner, there has been no addition to that fund for 16 or 17 years. As the fact that veterinary schools in other states are supported entirely by the State Government has become more generally known, it has become exceedingly difficult to obtain contributions from individuals.

DR. H. S. MURPHEY: Regarding the matter of publicity, there have been a number of farm papers during the last couple of years that have given us some very favorable publicity. Most of the men in charge of those papers would be glad to furnish more, but it has not been furnished them by the veterinarians. So far as I know, the best of the articles were written by laymen, and we ourselves are to blame in part for the lack of publicity.

Going back to the veterinary history of this country, we find the time when a large amount of veterinary work was of the empirical type described in the speaker's paper. The farm bureau movement is going through a critical period. When it comes out of it, we will have a better type of cooperation in the West; the farm bureau is doing a good service and I believe is here to stay.

In regard to the question of a graduate school, there never has been a paper presented to this Association or published in any of the veterinary hournals, so far as I am aware, that really discussed graduate work from the standpoint most of the men in this room understand it. Ninety-five per cent of the veterinarians in the United States look upon graduate work as a two-, four-, or six-weeks course, of fifteen hours per, in which they would be qualified to do all sorts of things. We need to get the profession straight on this, as well as the young men in the schools, as to what constitutes graduate work, the development from the academic standpoint. There is no other real graduate work except that type.

Regarding his opinion about our schools, the Doctor hit a sore spot with me. A few years ago a member of this organization visited Europe and wrote up the veterinary schools, the conditions there, and compared the methods of teaching, etc., in Europe, to those in the United States. I have it straight from seven instructors in some of the best veterinary schools in America that he never was in their anatomical laboratories, yet he compared the methods with an unfavorable or veiled criticism of our American system of teaching anatomy.

So we want to be sure that those men who write articles comparing our educational systems are Americans with first-hand information.

Regarding the plan of financing, a few years ago another gentleman in this room and I served on a committee to look into this matter in the Central West. The contiguous states, practically all of them, have no veterinary colleges. There is one in Kansas. I do not know enough about geography to know whether Kansas touches Iowa or not. (Laughter) I know it is in the neighborhood. The other contiguous states do not support veterinary education. We looked into the plan pretty thoroughly, gathered statistics, made a recommendation that a plan be attempted to encourage the contiguous states to furnish scholarships, probably through their established state institutions. It was suggested at that time that this go to the Association of Land Grant Colleges for discussion. Representatives of practically all the states meet there. That was just before the war period, and so far as I know, there was nothing done about it.

Regarding the question of federal support—I am speaking for myself personally—I am opposed to any more paternalism. We have too much paternalism now from the central government. We have too much domination in

veterinary affairs by far, as relating to certain types of education, and control of it. The Federal Government is assuming too much paternalism in telling state officials what to do already in quarantine work. I do not think we need any more of that. I would be opposed to having the Federal Government attempt to dictate to the colleges what their curricula should be.

I know the plan of investigation that the Federal Government made a few years ago in the veterinary colleges. With all due respect to the Federal Government and the personnel, they didn't make an investigation.

That brings out one other point that is going to have some publicity, some time, from some place. That is the question of the efficiency of the state colleges we now have. Many of the state colleges would be helped if the truth were told to their presidents and their boards of education regarding the real demand for higher standards of veterinary education and if the Committee on Intelligence and Education of this Association could publish the truth regarding all the schools.

It has taken a long time to elevate veterinary work in this country through this Association. It was largely directed toward one type of school, which is now extinct, but the conditions in some state schools, if I have been told the truth, are not as good now as they were in some of the private schools ten or fifteen years ago. It is a big question. The state ought to look after it. For example, one of the southwestern colleges had no veterinarian on its faculty. They apparently are taken care of by the local practitioner. They surely were looking for information at the time of the foot-and-mouth disease a few weeks ago. They actually sent night letters to veterinarians for information.

Dr. C. D. McGilvray: Dr. Murphey has raised a point, and I am not trying to bring him around to some other viewpoint and change his attitude toward the federal department. I wish only to state that we have been receiving during the past ten years a yearly grant from the federal government of Canada. I was apprehensive in regard to the same point Dr. Murphey raised, that if we were to spend the grant received each year from the Federal Government they might show an attempt to dabble in our affairs. Nothing of that kind has come out of it, and it proved quite satisfactory.

Dr. L. W. Goss: Questionnaires to students have brought out the factors which are stimulative to the study of veterinary medicine. We find that a large percentage of our students come from the communities where men are located who have good practices. Occasionally a man realizes the need of his community for a veterinarian and studies medicine. As long as times are rather hard for veterinarians in certain communities, I think our number of students will be small, but the successful veterinarian seems to be the stimulus.

I should like to make a statement relative to the schools—making a comparison of the schools of the United States with the European institutions. Having visited some nineteen schools in Europe and having been a student in one of them for two semesters, I think I can truthfully say the schools in America give as good training as the schools in Europe, taking them all in all. There is probably greater variation in the schools in Europe than in the United States, in their quality and type of instruction, equipment, and so on, but I doubt if the best in Europe are any better than the best in America.

I think our state schools are doing the best they can with the appropriations they have, and we all know that every veterinary school in the United States needs a greater appropriation. The question is: How are you going to get it? That is one of the big problems and a problem, I think, that each school has to work out for itself. I believe that each school will have to work out the advertising problem largely by itself. Different schools have tried different schemes. A good many have reported that they have been unsuccessful. Others report fairly good success in certain activities.

According to Dr. H. A. Wilson, state veterinarian of Missouri, Dallas County (Mo.) is without a graduate veterinary practitioner.

THE TEACHING OF VETERINARY MEDICINE TO AGRICULTURAL STUDENTS[1]

By J. F. SHIGLEY

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There is a definite place in the agricultural college curriculum for instruction in veterinary medicine. The amount of the material presented to students of agriculture and the manner of presentation of detail depend largely upon the training and inclination of the instructor. This discussion of the subject is intended to present certain facts concerning the work offered, and to attempt to clarify certain views held as to the extent of the instruction students obtain in these subjects.

With this in mind, the catalogs of state colleges were examined and the subjects pertaining to veterinary instruction listed. The courses offered represent rather a wide range, as indicated by the following: Anatomy and physiology, animal parasites, bacteriology, animal diseases, sanitary science, obstetrics, and clinics. It seems worth while to note the instruction to be given in these subjects.

A study of the anatomy and physiology of farm animals is fundamental to the proper understanding of certain problems in their care and feeding. Anatomy involves a discussion of the structure of the systems of the body, the relation of bone development to size, and includes a comparative study of the horse, ox, pig, and sheep. A rational view of body structure is emphasized, which should be of value in dispelling certain ideas of medication which are still held by men throughout the country. By this is meant the use of various drugs in the ear, for fistulae and other diseases; drenching through the nose; and use of rock salt per rectum for colics. Many such practices are still followed, and can be controlled only by proper understanding of body structure. Physiology deals with the function of the various tissues, organs, and systems, especially in relation to problems of nutrition. A number of colleges require that this course be given students specializing in animal nutrition and in chemical agriculture. Students specializing in animal and dairy husbandry usually elect this course, although it may be a re-

[1]Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924.

quired subject. The practitioner is able to secure valuable assistance in treating his patients if the herdsman or care-taker is properly informed as to the general principles of anatomy and physiology.

Animal parasites are a source of great losses to live stock owners. This course is presented with a view to stressing the economic importance of parasitic infestation and to provide the student with a working knowledge of their control. The promiscuous use of anthelmintics is discouraged, as proper treatment is based upon the parasite or parasites involved and the physical condition of the animal to be treated. The specific dip or drug to be used is not necessarily a part of this course, although, in the case of recognized dips, it is usually given. Such information is supplied to the student, usually before he enters college, through the medium of farmers' bulletins, so that he is already informed in this matter. His attention is called, however, to the necessity for a correct diagnosis of the parasite involved, which should be made by the veterinarian.

The physical condition of the animals should be noted before treatment is instituted. Owners of live stock or attendants should be impressed with the fact that drugs used for the removal of parasites have an effect on the animal treated. Frequent handling tends to interfere with a normal and continuous increase in body weight desirable to early maturity. Unnecessary medication and handling are therefore discouraged. The provision of clean quarters, clean food and water are the important factors in parasitic control which are emphasized in this course.

First-Aid Treatment Taught

Students electing bacteriology, including a study of pathogenic organisms, are impressed with the importance of these factors in causing disease, as well as control measures necessary after the infectious disease has made its appearance. Some schools include wound treatment in this course, providing instruction in first-aid measures applicable to the proper handling of wounds. As is the case with the course offered nurses, such a plan is indicated for prospective live stock owners or attendants. By first-aid measure, reference is made to proper cleaning and bandaging of wounds and the ordinary means of controlling hemorrhage. Removal of foreign bodies and suturing is properly the work of the veterinarian.

Certain colleges offer courses in obstetrics, dealing with par-

turition, dystocia, sterility, and attendant conditions. Students assist in handling cases, even to the extent of delivering the fetus, removal of placenta, and have charge of all after-care. It would seem that such a procedure, even with students of dairy and animal husbandry, is a mistaken policy and might readily be productive of harmful results. It cannot be argued as a principle of economy for the breeder, for without a background of veterinary training, one cannot hope to become a competent obstetrican. It is believed that this course might be designed to give the student an intelligent view of the importance of care in handling the pregnant animal, abortion, sterility, and the control measures necessary in preventing the spread of diseases of the genitalia.

One of the most popular courses, aside from anatomy and physiology, is that which deals with animal diseases. Catalogs convey the information that this subject deals with the classification of diseases, their economic importance, methods of prevention and control, sanitation and hygiene.

Erroneous Ideas Corrected

There has always existed an element of mystery and of curiosity in matters pertaining to disease. There are comparatively few individuals, young or old, willing to admit a lack of knowledge of this subject. Much of the knowledge is erroneous and limits the work of the veterinarian. The course is intended to dispel certain illusions as to the cause of disease, the means of spreading disease, and control measures for which the live stock owner is directly responsible. Difficulties of diagnosis and various factors which enter into making a correct diagnosis serve to increase the respect of the student for the work of the practitioner.

Considerable stress is placed on sanitation and hygiene, giving instruction along the same lines as would be given by the attending veterinarian in controlling a specific outbreak of disease. In speaking of veterinary extension work, primarily for the veterinarian, one writer states that some information should be given the live stock owner by saying that "no opportunity should be neglected to furnish information regarding sanitation and hygiene to those whose success and prosperity depend largely on maintaining their animals in the highest state of efficiency."

This course may rightly include a discussion of the laws regarding the shipment of live stock, quarantine regulations, movement of feed, and other factors dealing with management

of live stock in an infested area. Definite information may be presented regarding the work of the live stock sanitary board or other organization dealing with problems of disease control.

Past experience has shown that much may be accomplished through the agricultural student properly instructed in matters pertaining to the control of such diseases as tuberculosis, hog cholera, abortion, and foot-and-mouth disease.

In spite of educational programs, it is quite surprising that there exists in many sections such a lack of knowledge on the subject of tuberculosis. It is fortunate that there is such an opportunity for presenting definite information to agricultural students as is afforded in this course. In discussing tuberculosis, emphasis should be placed on the cause, means of distribution, and control measures. The various tests may well be explained, as well as care of animals during the test period. The disposal of reactors, the disinfection of stables, and new additions to the herd are problems of interest and importance to the student.

During the recent outbreak of foot-and-mouth disease, attention was called to the important symptoms, means of spread, and control measures applicable to outbreaks of this disease. It is believed that, in the event of a subsequent outbreak, these students will heartily cooperate with health authorities in the control of this disease. It is this spirit of cooperation with local, state, or federal authorities in disease control work which is sought by presenting some knowledge of disease conditions to live stock owner or attendant.

No Place for Prescription-Writing

It is felt that teaching prescription-writing, using definite prescriptions in this course, is a mistaken policy. Many students are keenly alive when making copy of formulae or methods of treatment, who fail to exhibit interest or to attempt to become familiar with control measures for which they are directly responsible. If such prescriptions fail as "cures," the instructor has added nothing to his credit.

Neither is it considered good form to advocate the purchase of books on materia medica, as it makes the student feel a confidence in his ability which is harmful and results in unnecessary losses.

It is true that many students request definite information regarding treatment. This, however, may be taken care of, either by explaining the difficulty encountered in making an

accurate diagnosis without veterinary training, and by emphasizing that treatment is dependent, not only upon a correct diagnosis, but upon the condition of the animal to be treated. Such a policy tends to increase respect for the veterinarian and for the subject of veterinary medicine.

Mr. E. S. Bayard, editor of the *National Stockman and Farmer*, in speaking before this Association on the subject of the "Agricultural Press and the Veterinarian," said: "If your young men are to practice among farmers to their mutual benefit, they must strive to understand." This bit of advice is applicable to the farmer in his dealings with the veterinarian. Teaching certain veterinary subjects, if the content be properly handled, will go a long way towards creating a wholesome sentiment between farmer and veterinarian. The veterinarian and the farmer should be real friends with an interest each way and not merely acquaintances.

Further, the proper presentation of these subjects is a means of enlightening the public mind as to the character and indispensability of veterinary science in economic and efficient agriculture. "The better informed a client may be, the more will he appreciate skill and ability."

Interest in Veterinary Science Stimulated

It stimulates interest in veterinary science and creates a desire on the part of some students to the end that they may complete the course offered leading to a degree in veterinary medicine. It is true that there are students of these courses who feel competent to handle all kinds of cases, young men who think they have "knowledge" but not "understanding." Experience usually serves to increase their respect for veterinary medicine as a whole, and teaches the lesson through losses for which they are directly responsible. These men would exhibit the same lack of discretion regardless of their course, and fortunately represent only a small percentage of the number of agricultural students taking these courses.

It must be understood that, regardless of the course, the personal element—the teacher—determines largely the subject matter presented. The teacher who is over-zealous regarding his position, or who feels he is doing the taxpayer a good turn by making the veterinary subjects appear easy or unimportant, can wield an unfortunate influence over the prospective clients of his fellow practitioners.

In conclusion:

1. There is a definite place for teaching certain veterinary subjects to agricultural students.

2. If properly presented, this instruction leads to greater dependence of live stock owners on competent veterinary service.

3. Instruction in animal diseases should be limited to first-aid measures, with proper emphasis on sanitation and hygiene, and the function of the veterinarian in treatment and control work.

4. The curricula of colleges will stand certain adjustments, as variations in subject matter are evident.

5. The subject matter presented is largely dependent on the personal training and inclination of the instructor.

Discussion

Dr. F. B. Hadley: Naturally, I am very much interested in this subject, as for seventeen years without a break I have been teaching veterinary science in agricultural schools. For fifteen years I did it, I am frank to say, in a very inadequate way. It places me very much in the same position as a dentist whom I have in mind. He said, "You know, every time I look into the mouth of a person whose teeth I filled up to a year ago, I feel that I took his money without rendering full service. A year ago we had a demonstration in a dental clinic, and I found I did not know how to fill teeth. I was doing exactly as I was taught to do when I was a student in college, but how inadequate it was.

"I am making amalgam by rubbing the ingredients together in the palm of my hand. I never realized it was impossible to get a good mixture without using more force. Now I use a balance which weighs a fraction of a milligram, and I take the exact amount of each material I wish to use, with the result that I have a definite product that will not shrink."

The reason for repeating this conversation is that we teachers of veterinary science to agricultural students can profit by it. Taking the cue, I have adopted a new method of presentation. It is proving most effective, if one can judge by the way that students react. Moreover, it has received the approval of instructors in other branches of agriculture in our college, particularly the men who are interested in laboratory work.

Most students of agriculture, I think, in their study of veterinary science, have been subjected largely to a course which may be classified as strictly a lecture course—lectures and recitations. At least, this is the method I have used for many years, feeling that there was no opportunity to teach veterinary science from the standpoint of a laboratory course.

Now, if we are going to place veterinary science in agricultural schools on a par with other subjects in the curriculum, we must take our students into the laboratory and let them do things with their hands and see things with their eyes, in a way comparable with the opportunity that is given them in other sciences now being taught.

Our plan is built upon a series of laboratory exercises designed to give the student a clear conception of the structure and functions of the animal body. It requires two two-hour laboratory periods a week with another two-hour period for quizzes and recitations. The only equipment needed are microscopes and the supplies usually available in any laboratory equipped for the study of a biologic science.

I will detail one exercise as an illustration. Please note that this exercise is designed to amplify what the agricultural student has had presented in courses in animal husbandry and physiology but without veterinary application.

A pig or a rabbit or any small animal is anesthetized. The ordinary surgical precautions of the operation for castration are observed. Upon removal of the testicle, the student takes a small quantity of the fluid from the epididymis, with a platinum needle, and examines it under the microscope, which reveals the inactive spermatozoa. Then he makes another similar preparation, but dilutes the material with normal saline solution. The student discovers that the sperm cells have been activated by the salt solution. As a result, he is impressed with several very important facts about the anatomy and physiology of the male reproductive organs.

This is but one of thirty similar exercises. The reason I am so enthusiastic about this type of work is the way it appeals to students. The whole object is to correlate and try to fit into the agricultural curriculum the subject of veterinary science so as to round out the information the student has had in animal husbandry and related courses.

I shall be very glad to furnish copies of my outline to any who are doing this type of teaching. My one request is that you add to and substract from the exercises as seems desirable, in order that eventually we may work out a plan of laboratory procedure which would be adequate for the needs of our agricultural students.

DR. C. P. FITCH: I have passed through somewhat of an evolutionary stage in regard to the teaching of veterinary subjects to agricultural students. As you know, it has been my privilege to be a member of a veterinary faculty for several years, and I have been for several years a member of the faculty of an agricultural college. I have seen a great many things occur in the teaching of these subjects. In the first place, it is my opinion that the teaching of veterinary subjects to agricultural students usually leaves out of consideration the curriculum of the agricultural student himself. The curriculum of the agricultural student is even more crowded than that of the veterinary student. Veterinary science for the agricultural student is only a very, very small part of the necessary education of that individual, but it is essential and should have its proper place. Remember that you are not educating a veterinarian, but an agriculturist.

I do think that some institutions leave out of consideration the important part which a little veterinary science or veterinary medicine would have in stimulating an interest in that science among our progressive and up-to-date farmers who are graduates of our agricultural colleges.

I believe that the principal criticism of veterinary education in agricultural colleges is that kindergarten instruction is given to college students. You must remember that you are dealing with a college student when you are teaching veterinary science and that he is entitled to just as fundamental a basic education as he would be if he were in a veterinary college. For that reason, all I ask is to look over the textbooks written on the subject of veterinary education for agricultural students. Most of these are based upon simple, elementary things that anyone with a high school education ought to grasp. I believe that instruction should be given on the basis of a college student, not on the basis of a man in the high school or in the grade school. I do not believe that dissecting or laboratory work has any part in the education of an agricultural student in veterinary science. They have not time for it. If they had time, it would be a very fine thing, but their curriculum is even more crowded than the curriculum of veterinary medicine.

For that reason, I believe that you could sort out and give to the agricultural student the things which will give him the basic knowledge which is necessary for the proper understanding of veterinary medicine and incite in him a respect for veterinary education which he who gives and renders an efficient veterinary service ought to and must possess. I thank you. (Applause.)

DR. R. R. BIRCH: I think there are two things we can hope to do in teaching veterinary subjects to agricultural students. One of those things is to prevent the student from becoming a quack himself. The other is to protect him against quacks. If we do those two things we have done all we can hope to do in the time allotted.

From the standpoint of method I find one thing that arouses a great deal of interest among the students. I watch the agricultural papers and the articles

on veterinary subjects in them. The questions and answers are of particular interest. I take some of these subjects up with the class, sometimes reading an article and asking the students if there is anything wrong with it. It is a surprising thing that in a large percentage of cases the diagnosis is in doubt. That is the very thing we want to put stress on. How did the man who answered this question by mail know what disease he was dealing with? The main thing this method does is to teach the students to think of these things for themselves and when they read something, not to accept it as absolutely true and as the last word on the subject.

Then, there is the positive type of instruction which really gives the student information based on scientific principles. If we can impress our students with the fact that there is a place they can go to, to get authoritative information, even if some of this knowledge is technical and beyond them, we have done some good. We should not give them the idea that we are summarizing veterinary medicine. The students must know that we are merely teaching them a few things about it and trying to teach them those things in a thorough way so when they are graduated and have to apply scientific knowledge they will have formed the habit of seeking it from sources that are authoritative.

DR. W. F. GUARD: It seems to me that we are drifting in the opposite direction from the course just recommended by Dr. Birch. It is certainly time we as a profession realize our ultimate destination if we continue to pursue our present course. It is not possible to summarize veterinary medicine and condense it into a few pages of simple terms which can be understood and practiced by those who read. We have been fighting for a long time to raise the standards of the profession and eliminate the disqualified.

It seems to me, through some of the teachings and publications in recent years, that we are tending to revert to a state of quackery, worse than anything we previously have had. I need only to cite you to a few bulletins that are published, supposedly for the aid of farmers, to impress this upon your minds. Recently I received one such bulletin in which all of the common ailments were diagnosed in a few simple terms and specific treatments recommended with additional instructions, "In case that does not work, have the veterinarian prescribe medicine." I do not know what the author thought he had prescribed, if not medicine.

In my opinion such bulletins, broadcast all over the country, do more harm than is done by the few instances of misinformation and improper instruction given to students attending certain agricultural colleges. Both are wrong but my point is that at the present time the bulletin is even the greater of the two evils. I think they are both matters pertaining to teaching veterinary subjects to agricultural students and should be seriously considered by our Association. Such practices are belittling and humbling the practitioner, and in time will destroy our profession. There are very few places, in some of these bulletins, where the veterinarian is even referred to. They explain how simple it is to diagnose a disease and tell what treatment to give, but only in rare instances do they say, "Call in the veterinarian."

If such pernicious advice is followed where will they go to find the veterinarian to call and where can you find any encouragement for real red-blooded young men to enter our veterinary colleges and profession when we have it simplified and belittled to such a degree? I think we should consider these problems very promptly and thoroughly.

DR. J. F. SHIGLEY: I just want to emphasize the fact that it really depends upon the personnel of the teaching staff, the extent of instruction and, further, that there is ample opportunity for some basis of regulation in connection with the work. Teachers in agricultural colleges would appreciate some regulatory measures in connection with their instruction.

Johne's disease is reported to have made its appearance recently in a herd of high-bred Jersey cattle near Toledo, Ohio.

South Solon, Ohio, is reported to be in need of a veterinarian.

THE VETERINARIAN AND EXTENSION WORK[1]

By DON MCMAHAN, *Fargo, N. D.*

N. D. State College of Agriculture

It is often said that there is nothing in a name or a title. I claim the name of a thing may help to make a success or failure of a project. The veterinarian has always stood for service. This service in the past, and largely up to this day, has been a free-for-all cure-all service, little attention, until of late years, having been given to preventive medicine. Extension means free service. Extension veterinarian, literally translated, means free veterinary service. This is anything but what the veterinarian in extension work should try to do.

After laboring under such a handicap as Extension Veterinarian for a title for one and one-half years, this title was dropped and the title of "State Agent in Animal Health" was adopted. While at times considerable is said about diseases, and some are discussed in detail, as we go on, more and more is said about the health of animals and less and less about disease. There are many titles that could be taken—State Agent in Animal Hygiene, State Agent in Preventive Medicine, or Specialist in Animal Health, or Specialist in Preventive Medicine. Almost any title is better than Extension Veterinarian. This title, in our experience, invites trouble.

Many times, in attending farmers' meetings, the most hopelessly incurable chronic cripples would be brought in miles to be treated by the visiting veterinarian free of charge, and the moment the owner found out he could not cure a fistula of the withers or have an "original" operated upon, he was not the least bit interested in anything that might be said at the meeting, and would immediately "beat it" for home. From our experience in North Dakota, it is of utmost importance to select a proper title for the veterinarian in extension work, and "Extension Veterinarian" is indeed a very poor title. This is the first important point.

The second point of importance is to adopt a safe and sound policy. All deans of veterinary departments should be careful not to allow any director of extension to turn a man loose in this field without a well-understood policy.

[1]Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines Iowa, August 19-22 1924.

First under policy comes harmony and cooperation with the federal, state, and practicing veterinarians, without duplicating efforts. We must render a service to live stock men and county agents; also to keep Mr. County Agent in his right place concerning veterinary service. I doubt very much if there has ever been a man start into veterinary extension without a very definite policy who has not found himself on the inside of an imaginary triangle, one side of this triangle was formed by the federal and state men, doing a very definite piece of work; the practicing veterinarian zealously and rightfully guarding a gradually restricted and shortening second side; and the county agent force advancing on the third side of this space. I doubt if Mr. Extension Veterinarian has not often wondered if there was a possible chance to escape unscalped at one of the corners, or just "buck the line" and take the consequences.

Teach Sanitation

Second under policy should be to spread the fundamental principles of sanitation. It seems to be the concensus of opinion that when we make any great headway in controlling and eradicating animal plagues, it will be when the live stock man shoulders his part of the responsibility. The fundamentals we are trying in every way possible to get the live stock men of our state to adopt are to quarantine the sick animal, to make the proper disposition of the dead animal, and to know the importance of cleanliness and common-sense disinfection.

Third under policy is to teach the value of the well-trained veterinarian. This may be done in many different ways.

The third and the most important point in veterinary extension is the "Program of Work."

First under Program of Work come demonstrations. Sanitation demonstrations have been worked out for boys' and girls' clubs. General farm sanitation, pig sanitation, and poultry sanitation demonstrations have been put on by eighteen teams in North Dakota during 1924. Bringing out the fundamental principles of sanitation, showing the relation of a well-laid-out farm to the health of the animals, with the proper arrangement of the farm buildings, admitting plenty of sunshine and ventilation. How easy it is to quarantine sick animals where the lots and corrals are properly arranged.

The rotation of land is important to raise the proper rations for stock, also to keep it free from disease and parasites. It is

easy to demonstrate the proper methods of disposing of dead animals on the farm, which leaves a lasting lesson. The simple truths of disinfecting, cleanliness, fire, scalding water, etc., are dwelt upon in this demonstration. Twenty minutes is the minimum and forty minutes the maximum time allowed for a demonstration. The team representing a county in the state contest is the one winning the county contest. The competition and interest is keen. Judging by the comments and interest shown by the adults and the requests for these demonstrations to be given before all kinds of gatherings, they are of considerable value.

Interesting Demonstrations

A demonstration on "Wholesome Milk Production" has created great interest. This is an easy and simple demonstration, stressing the sterilization of milk utensils, the clean cow, the small-top milk pail, and the cooling of milk. We had four such teams this year.

A demonstration on "Restraint and Control of Cattle" was put on by one team, taking up the proper halters and how to make them, the war bridle, drenching the cow, the squeeze chute (made by the boys at a cost of less than $5.00), casting cattle by half-hitches around body and three-loop method around legs. This demonstration proved to be one of the best.

In all demonstrations, the spirit of contest is not allowed to overcome the value of the demonstration. To get the lessons taught by the demonstration put into practice on the farm homes is the one big idea. We have some hundred and eighty homemakers' clubs in North Dakota. The members of these clubs are always interested in questions relating to the health of the poultry and the relation of animal to human health. The women on the farm will be largely responsible for bringing about many of the changes that will have to come before we can ever hope to control many animal diseases. A few of the homemakers' clubs have put on demonstrations of "Wholesome Milk Production" and "Fly Control." If there was time to devote to those clubs, many demonstrations could be worked out that would be of untold value, and, believe me, the women put on a real demonstration.

All kinds of demonstrations may be worked out by the agent himself, if he wishes to do so, which may have more or less value. A few years ago, quite a little time was devoted to this

kind of work. It is one of the best methods to gain the confidence and respect before a strange audience. Here the extension agent has the chance to prove his superior skill. It has never failed with the writer. Some of these demonstrations have been "Farm Surgery," "Restraint of Animals," "Unsoundnesses of Horses."

General meetings take most of the time during the winter months. Institutes and short courses lasting from one to four days, give an opportunity to discuss many subjects of interest to any part of the state. Plans for the coming year's work are also made at this time with the county agent. Picnics during the season take some time, and are good places to put on demonstrations and gain many friends. Special meetings with all breed associations, discussing tuberculosis and abortion disease with the dairyman and beef man, cholera with the hog man, and the various ailments of poultry with the poultry man take quite a little time. The opportunity to go before Rotary, Kiwanis, and Commercial clubs and all civic organizations should never be overlooked. In North Dakota, fifty per cent or more of the membership of these organizations are not only sympathetically but financially interested in the live stock industry. These men are always deeply interested in any subject vital to the health of live stock. Programs for farmers' clubs and homemakers' clubs may be worked up. This gives them a chance to have something definite to do, and prevents such bodies from just organizing and then dying of dry rot from the lack of a program of work.

Exhibits at Fairs

Fair work and exhibits may be enlarged upon, and a great deal of time may be, or could be, devoted to this work. A combination of demonstration and exhibit could certainly be made of vital interest. Educational campaigns for tuberculosis eradication, hog cholera, abortion, and blackleg control take a lot of time. A week here, a few days there, on such work, one soon wonders where the weeks and months have gone to. With such a program of work, one cannot find time to answer half the requests to appear before different meetings. With such a program, there is practically no duplication of effort with other field forces, there is no trespassing upon the practicing veterinarian, and harmony and peace prevail.

With a proper title and policy, and with a good program of work, veterinary extension can stand along the side of any

other extension project, free from criticism, taking its proper place in educational work.

If I were allowed to choose a man to do veterinary extension work, I would pick a man with as large a human experience as possible, with as large an experience in veterinary medicine as possible, he should be a good judge of all classes of live stock, his word should be the last word in feeding, breeding, and management of live stock. Who has a better right to be an authority on such subjects? Above everything else, he should be a profound student of preventive medicine, a genuine all-round sanitarian. As an extension agent, he should remember that the average educational standard of this country is the sixth grade, so he should talk in sixth-grade language when addressing the laity.

Lastly, and in conclusion, just remember that extension means dealing with groups and not with individuals. This one thing alone will distinguish between extension and practicing a profession.

DISCUSSION

DR. G. S. WEAVER: I have nothing in particular to add to what Dr. McMahan said. Our experiences are practically along the same line. Our work differs very little in South Dakota. However, we do some diagnostic work. Probably it should be done by somebody else, but it is not, and somebody has to do it. We are called by veterinarians as well as farmers for diagnostic work. Considerable consultation work is carried on. The majority of our time is spent in meetings of different kinds, especially short courses, farmers' institutes, and like meetings. We visit many civic organizations and give some lectures of various kinds along animal disease lines, the same as they do in North Dakota. Some time is spent in club work along similar lines to North Dakota. As far as any particular differences are concerned, there are not any. Our extension work and our problems are exactly the same.

TUBERCULIN TESTING IN MAINE

Dr. L. Sherman Cleaves, practitioner at Bar Harbor, Maine, has arranged with the Hancock County Farm Bureau to test all the accredited herds in that county this spring. The Farm Bureau will make out all the test charts and cooperate with Dr. Cleaves so that practical area work will be done, as most of the herds in the county are in the accredited status.

This method of cooperation between farm bureaus and practicing veterinarians in testing accredited herds is conducive to much satisfaction to live stock owners and veterinar ans alike, and is in the interest of the common welfare, because, by mapping out the work so that several herds may be tested on one trip, reasonable charges can be made. That brings satisfactory compensation to the veterinarians and causes much favorable comment among cattle owners.

EXPERIMENTS ON LOWERING THE COST OF VACCINATING AGAINST HOG CHOLERA[1]

By JAMES W. BENNER, *Ithaca, N. Y.*

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INTRODUCTION

Following Circular 41 by deSchweinitz and Dorset[1] and Circular 43 by Salmon,[2] the Bureau of Animal Industry published Bulletin 72 entitled, "The Etiology of Hog Cholera," authors Dorset, Bolton and McBryde.[3] In 1908, the Bureau published Bulletin 102 entitled "Further Experiments Concerning the Production of Immunity from Hog Cholera," authors, Dorset, McBryde and Niles.[4] In reading these publications I am greatly impressed, first, by the number and importance of the new discoveries described; second, by the thorough knowledge of the disease and its immunology which the authors had at that time; third, by the lack of newer knowledge gained since 1908; and fourth, by the poor results from our methods of applying the remarkable knowledge which these early investigators gave us.

The descriptions of history, cause, symptoms, course, lesions, and prevention of hog cholera, as given in bulletins 72 and 102, have not changed with time. Much has been written, but comparatively little investigational work has been done, since the first great achievement of finding the true cause and how to immunize against it. Our failure to gain new knowledge is doubtless due in large part to facts brought out by Uhlenhuth, Haendel, Craig, Stockman, and later Tenbroeck,[5] in their work with hog cholera virus, showing that experiment animals other than hogs are unsatisfactory. This makes the cost of such experiments high when compared to work in which mice, rats, rabbits and guinea pigs can be used. The very infectious nature of hog cholera, making it difficult to obtain sufficient numbers of susceptible pigs and suitable quarters for their confinement while experimenting, are other hindrances.

Regarding our poor results from present methods, I would say that since the early work of deSchweinitz, Dorset, McBryde, and Niles, swine growers and veterinarians have too frequently failed to make use of the important information contributed by

[1]Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924

these men. Swine growers will keep their herds immunized for a time, but after two or three years of maintaining a cholera-free herd they frequently feel that they can save the cost of immunization. Immunization is discontinued and in the usual course of events they lose their hogs with cholera.

Veterinarians in some cases do not strive to perfect their knowledge and technic and so do not render effective services in controlling the disease. In some cases unfair fees for vaccination have been charged. The reported 25 to 30 million dollar annual loss from cholera is a sum that farmers of this country can ill afford to lose and their impatience with results from methods employed in the past are being frequently expressed in articles in farm papers. Representative of the latter is an article entitled, "A Chance to Save Thirty Million Dollars," by Harry R. O'Brien, which appeared in the March 29, 1924, issue of *The Country Gentleman*. In this article Mr. O'Brien emphasizes the importance of vaccination and discusses briefly the two common methods used, namely, serum-alone and simultaneous, also the best time to vaccinate. He contrasts the fair cost of vaccination when done by county agents or by the owners themselves with the unfair cost when done by veterinarians who, in the past, have too frequently made a practice of charging a profit on serum used, in addition to a fee for administering it. He discusses the organized plan in Illinois, and mentions a similar one in Iowa, whereby farmers are more and more taking the work into their own hands in an effort to cut down the cost of maintaining their swine herds immune to cholera.

While this paper is being written it is rumored that Boynton, of the University of California, has produced a vaccine at very low cost, and simplified administration to such an extent that its use promises to replace our present method of vaccination against the disease. I have not as yet had an opportunity to read an official publication on Boynton's work and therefore am proceeding on our known methods.

I also have reports that reliable serum companies in the Corn Belt are selling serum for less than one-half cent per cubic centimeter, which, judging from previous years, would seem to be a rock-bottom price. However, those who are paying vaccinating bills, or collecting them, know that the cost is still considerable and that without a doubt hog cholera control is greatly retarded because of it. Cost is not the only factor retarding the work but it is an important one.

1. Immunizing Young Pigs

Just as long as the dosage of immunizing agents depends upon the live weight of the animal it will be important to know how soon after birth pigs can be vaccinated. However, the subject of vaccinating pigs involves some very important problems other than age, weight, dosage and technic of administration. Presuming that a permanent immunity against cholera is the ultimate aim, the problem confronting us is to discover the cheapest and safest method of conferring permanent immunity on pigs of various ages under various conditions of care and management. This complex problem requires the judgment of a man who knows not only hogs but hog diseases. The veterinarian is best qualified to deal with it if his judgment is based on thorough knowledge. It is well to know the history of a pig from time of birth until he is presented for vaccination and there is some evidence that we should know the history of his mother before he is born. Unless the veterinarian takes pains to acquaint himself with the past management of pigs as well as the present and future, he cannot serve his client in the most economical way and will simply be boosting the movement of vaccination by laymen that is already well begun.

In 1922 an experiment was started on the pig immunity phase of lowering the cost of vaccinating. The results of the 1922 experiment have been published and I will but summarize them briefly. All pigs vaccinated were from grain-fed, immune mothers that had been kept on ground more or less seeded with hog cholera virus. They farrowed about 65 to 75 per cent live offspring. Fifty-four pigs were each given 10 cc of serum and 1 cc of virus at three weeks of age. Ten more were each given 1 cc of virus and no serum at the same age. Three weeks after the administration of the serum and the virus in the one group and the virus in the other, the pigs were dipped and moved to cholera-free ground. One hundred seventy-one days after vaccination, 58 that survived were given an injection of 2 cc of virus alone to test their immunity. Temperatures were taken for one week following the latter injection. No temperatures or other clinical symptoms characteristic of hog cholera appeared. The results are shown in table I.

In 1923 the experiment was continued, but that year our immune sows were kept on hog cholera-free ground until a few weeks before farrowing. They farrowed about 25 per cent live

TABLE I—*1922 pig immunity experiment*

LITTER IDENTIFICATION NUMBER	PIGS GIVEN SIMULTANEOUS TREATMENT AT 3 WEEKS OF AGE (SERUM, 10 CC; VIRUS, 1 CC)	PIGS GIVEN VIRUS-ALONE TREATMENT AT 3 WEEKS OF AGE (VIRUS, 1 CC)	PIGS GIVEN TRIAL INJECTION 171 DAYS AFTER VACCINATION (VIRUS, 2 CC)	RESULTS OF THE TRIAL INJECTION
8	8	1	9	Remained well
6	4	1	5	Reamined well
1	4	1	5	Remained well
12	8	1	9	Remained well
10	1	1	0	Remained well
11	3	1	2	Remained well
13	9	1	9	Remained well
4	4	1	5	Remained well
5	6	1	6	Remained well
9	7	1	8	Remained well
TOTALS	54	10	58	

pigs and we had only 18 animals to work on. The change from cholera-free to cholera-contaminated ground may have had a significance. The plan of the experiment was the same as in 1922, with the exception that the time between vaccination and

TABLE II—*1923 pig immunity experiment*

LITTER IDENTIFICATION NUMBER	PIGS GIVEN SIMULTANEOUS TREATMENT AT 3 WEEKS OF AGE (SERUM, 10 CC; VIRUS, 1 CC)	PIGS GIVEN VIRUS-ALONE TREATMENT AT 3 WEEKS OF AGE (VIRUS, 1 CC)	DAYS FROM VACCINATION TO TRIAL INJECTION	PIGS GIVEN TRIAL INJECTION (VIRUS, 2 CC)	RESULTS OF THE TRIAL INJECTION
5	5	1	264	6	Remained well
1	3	1	260	4	Remained well
4	2	1	251	3	Remained well
2	0	1	249	1	Remained well
6	6	1	216	4	Remained well
TOTALS	16	5		18	

the trial injection of virus was varied more and was lengthened, as is shown in table II.

In table II it will be noticed that a total of 21 pigs were treated by the two methods, namely, the simultaneous and virus-alone, but only 18 received the trial injection of virus. Of the 3 pigs that died between the time of vaccination and the trial injection two were very runty from birth; one of the runts died 19 days after vaccination and on autospy petechiae were found on the mucous membrane of the bladder, also on the kidneys, which looked very suspicious of cholera; the other runt died 42 days after vaccination and on autopsy a very bad infestation of ascarids was all that was found; the third pig met accidental death by being caught under a heavy gate.

From the results shown in tables I and II, it would seem that pigs farrowed by and suckling immune mothers have a grade of immunity sufficiently high at three weeks of age to protect them from an injection of 1 cc of virus. It would also seem that the immunity conferred by vaccination at three weeks of age was sufficiently permanent for all practical purposes, for in 1923, after the trial injection of virus, notice that the results were the same as in 1922. All the animals remained well.

Reynolds[6] gave 5 cc of virus to pigs 5 to 7 days old, farrowed by immune mothers, without harm, but found that this resistance to virus could not be relied upon after the pigs were about 5 weeks of age although some pigs retained the resistance until they were 12 to 14 weeks of age.

The pig immunity experiment of 1922 and 1923 is being continued this year (1924), and we have vaccinated our spring pigs but still have sows farrowing which cannot be included here. The sows and pigs this year have accidentally been exposed to cholera infection of a concentrated nature, both before and after farrowing, and our results so far have been somewhat different from those of the two previous years, as will be seen in table III.

I feel that this difference is of enough importance to be mentioned here, although the data for the year's work will be incomplete until after the trial injection of virus is made.

Out of 70 live pigs farrowed, 10 died before vaccination and 7 after vaccination. Of the 10 that died before vaccination, 1 died in 24 hours after birth and showed cholera lesions. Two died in 4 days and showed cholera lesions. Of the 7 that died before vaccination in litter 11, all showed cholera lesions. Of the

TABLE III—*1924 pig immunity experiment*

Litter Identification Number	Toal Number Farrowed	Born Dead	Died Before Vaccination	Given Simultaneous Treatment at 3 Weeks of Age (Serum, 10 cc; Virus, 1 cc)	Given Virus-Alone Treatment at 3 Weeks of Age (Virus, 1 cc)	Died After Vaccination	Cause of Death
1	13	9	0	3	1	0	
3	13	6	0	6	1	1 Virus	Injury and cholera
5	11	3	0	7	1	0	
4	10	1	0	8	1	0	
2	10	3	0	6	1″	0	
7	9	4	0	4	1	1 Simult. 1 Virus	Change in feed and cholera Change in feed and cholera
9	11	6	0	4	1	1 Virus	Cholera
10	7	0	2	4	1	0	Cholera
11	7	0	7	0	0	0	Sow slow to give milk. Poor suckler. Cholera
12	8	1	1′	5	1	2″Simult. 1″Virus	1′—Cholera. 2″—Injury and cholera. 1″—Cholera.
6	6	2	0	3	1	0	3 simult. treated—crippled and sick Virus pig O. K.
TOTALS	105	35	10	50	10	7	

7 that died after vaccination, 4 had received virus alone and 3 had had the simultaneous treatment. All showed enough clinical symptoms, or postmortem lesions, or both, to incriminate hog cholera virus as a cause of death. But causes other than cholera virus could also be determined as mentioned in table III. Cholera lesions were present so regularly in the pigs that died, both before and after vaccination, that I began to wonder whether the pigs were not being born with them. Hog cholera lesions in aborted fetuses have been reported but I have not found a record of this condition in pigs that appeared normal when farrowed.

The last sows which we have had farrow, some of which were kept under the same conditions, but which have farrowed since table III was made, have thrown some light on this point. I very deeply regret now that I paid so little or practically no attention to pigs born dead before this time, except that in 1923 our sows farrowed so many dead pigs that an investigation for infectious abortion was made with negative results.

July 30, 1924, I held an autopsy on one pig that had been laid upon and killed by sow 13, the second night after his birth.

The bladder, kidneys, and lymph glands showed almost typical lesions of hog cholera. The mother of this pig was a long-time immune and had been on contaminated ground since conception. On August 3, sow 17 gave birth to 10 pigs, 6 alive and 4 dead. I autospied three and found cholera lesions in the bladder, kidneys and lymph glands. The fourth pig I put in the ice box and autopsied the next day, August 4, and found practically the same lesions. To aid further in diagnosis I injected 1.5 cc of heart-blood into a susceptible shoat weighing 70 pounds. On the same day one of the pigs from this litter was killed. Hog cholera lesions were found and 1.5 cc of the heart-blood of this pig was also injected into a 70-pound shoat to aid in diagnosis.

June 13, I had injected a susceptible pregnant sow with an experimental serum and virus mixture, mixed in the proportion of 20 cc of serum to 0.5 cc of virus. She was kept on cholera-free ground, checked by other susceptibles, and on August 2 she farrowed 5 pigs alive and apparently well. On August 4, I killed one of these pigs and found practically the same cholera lesions that I had found in the pigs from the long-time-immune sow which had been kept on badly contaminated ground from date of conception. It would seem, therefore, that an exposure to natural infection and the simultaneous treatment have the same effect upon the young. I injected a 70-pound susceptible shoat with 1.5 cc of the heart-blood of the pig from this litter and placed a susceptible shoat of the same age and size in the pen with the three injected on this date. These four shoats were observed for eight days and no clinical symptoms of cholera were noticed. They were later injected with a known virus and found susceptible.

On May 14, I injected a pregnant sow with 70 cc of the same experimental stock serum and virus mixture. On July 11 she was moved from cholera-free ground to contaminated ground and given 2 cc of potent virus alone, to test her immunity. Her temperature was taken daily for one week. No rise occurred. She remained well and on August 5 farrowed six pigs apparently normal.

On August 6, a sow that had had the very same treatment as the one just described farrowed 7 pigs, 5 apparently normal and 2 dead ones. The dead pigs showed hog cholera lesions. The night after farrowing, one of the five was laid upon and killed. Postmortem lesions in this pig were those of hog cholera.

From the lesions observed in pigs at birth or shortly after

birth, and from the results of the injections of the heart-blood into susceptible shoats, the significance of the lesions in pigs of this age is questionable. However, these cases explain my reason for the statement that there is some evidence that one should know the history of pigs before birth, as well as afterwards, if it is desired to give them permanent protection from cholera in the most economical way.

From present knowledge it seems safest to consider pigs farrowed of and suckling immune mothers as passively immune to cholera when a noticeable immunity against the disease is present. This passive immunity is sometimes of such a high grade at three weeks of age that it will protect from an injection of 1 cc of potent virus or some exposure to natural infection. The grade of this passive immunity seems to depend on the antibodies received indirectly from the maternal circulation before birth and the milk after birth. Therefore, if hog cholera virus by either natural or artificial means reaches the pigs before birth they may develop lesions and some may die. After birth they may sicken with the disease, especially if the exposure to infection is severe and if the sow is of the heavy lard type that develops her fetuses poorly, is slow to give milk when farrowing and nourishes her young insufficiently throughout the nursing period; or again, if the pigs are crippled or robbed by stronger pigs. In brief, it seems that the physiological equilibrium is balanced on a very fine edge and it takes but little in the way of infections, infestations, or mechanical injuries, to give cholera a fatal advantage.

In the comparatively few animals included in these experiments, a permanent immunity has been produced by giving the simultaneous treatment, also the virus-alone treatment to pigs three weeks of age if farrowed of and suckling immune, grain-fed mothers. However, due to the small number in the experiments and the very different results obtained by some of the other investigators, in practice I allow three weeks for this insufficient data and give the simultaneous treatment at six weeks of age *if the pigs seem normal and thrifty and have no history of being severely exposed to hog cholera virus previous to or at time of vaccinating.*

If the pigs are in any way unthrifty because of infections, infestations or mechanical injuries, or there is danger of exposure to cholera virus on or around the premises, I use the serum-alone treatment as soon after birth as seems necessary and repeat it at

intervals of three or four weeks until the physical condition of the animals seems to warrant the use of serum and virus.

A study by well-checked experiments should be made of the physiological effects of the simultaneous treatment on all ages of pigs, especially baby pigs. It is a very common belief, based on practical observations among swine growers, that the simultaneous treatment has quite a marked stunting effect on growth and development. It has been reported that experiments on this point have been performed but I have not succeeded in finding records of them.

On the other hand, when using repeated doses of serum alone there is always a tendency to wait too long between treatments. Parke,[7] of the New York City Health Department, has found that repeated doses of diphtheria antitoxin give sufficient protection for about one-half the time that is given by the first treatment. Porter,[8] in recent work, found that a serum-alone treatment gave efficient protection against hog cholera for a period of four or five weeks, but whether or not the second, third or fourth serum-alone treatments would last as long or confer as high a grade of immunity as the first has, to my knowledge, not been worked out. Of course this analogy is not exact, for the diphtheria antitoxin is heterologous, being taken from horses and used on humans, while hog cholera serum is homologous, being taken from hogs and used on hogs. However, it has been observed in practice that under severe exposure to hog cholera virus, or predisposing causes, or to both, a serum-alone immunity, produced by the first treatment, may weaken in two and one-half to three weeks to a point where some of the animals may contract the disease and may die.

I wish to say in closing this phase of the subject that I am not at all satisfied with our present knowledge of young pigs and how to immunize them against this disease. Ideas based on theories about this subject are numerous and while they are necessary in planning experiments they are often confusing when published. What we need are more facts based on experiments and better methods of applying what we know.

2. Using Mixed Serum and Virus

If serum and virus can be handled together where the simultaneous treatment is to be given, it will save the time of separately bottling and administering the virus. Saving time cuts cost and therefore has a direct bearing on my subject.

B. A. I. Circular 43,[2] issued February 12, 1904, contains information concerning the use of disease-producing blood and antitoxic blood and states that these products have been used successfully both separately and combined.

Subsequent to the publication of Circular 43, McClintock, Boxmeyer, and Siffer[9] attempted to use attenuated virus, also a combination of disease-producing blood and immune blood, but they were only partially successful.

In 1921, Duval and Couret[10] published experiments in which they had used a mixture of desiccated anti-hog cholera serum and desiccated hog cholera virus successfully. The action of a serum-virus mixture must depend on the potency of the products and the chemical and bacteriological properties of each, separately and when mixed. This gives rise to many possibilities and since very little is known about these properties, it seems that more experiments are justifiable.

A preliminary experiment was made by mixing 1 cc of stock virus with 50 cc of stock serum. Twenty-five cubic centimeters of the mixture were injected into the axillary space of a 50-pound susceptible shoat (No. 97) which was kept on the hog cholera-free ground (see table IV-A). Temperatures were taken daily for a week after the injection. No rise occurred. Seventy days

TABLE IV-A—*Mixed serum and virus experiment*

PIG NO.	WT. (LBS.)	VIRUS (CC)	SERUM (CC)	METHOD	RESULTS
March 23, 1923					
97	50	½	25	Serum mixed with virus 30 minutes and injected into axilla	Remained well
August 15, 1923					
1	30	2	10	Serum injected in one axilla, virus in the other	Remained well
2	37	2	10	Serum injected into axilla, virus through same needle, same place	Slight temperature reaction, but quickly recovered
3	33	2	10	Serum mixed with virus 30 minutes and injected into axilla	Slight temperature reaction, but quickly recovered
4	68	2		Virus injected into axilla	Hog cholera
5	33	2		Virus injected into axilla	Hog cholera

later, 2 cc of potent virus were injected to test the immunity. The shoat remained well which was evidence of a permanent immunity.

August 15, 1923, each of five shoats was given 2 cc of stock virus into the axillary space (see table IV-A). In one pig of this group, 10 cc of stock serum was given into the other axilla, constituting the regular simultaneous treatment. After the injection of virus another pig was given 10 cc of serum through the same needle before the needle was withdrawn. A third pig was given the 2 cc of stock virus after it had been mixed with 10 cc of stock serum for 30 minutes. Pigs 4 and 5 were given the virus but no serum. The virus pigs showed a cholera temperature on the second day, were killed for virus the fourth day and showed lesions of acute cholera. Pigs 2 and 3 showed slight temperature reactions the sixth day and did not eat well but

TABLE IV-B—*Mixed serum and virus experiment*

PIG NO.	WT. (LBS.)	VIRUS (CC)	SERUM (CC)	METHOD	RESULTS
August 22, 1923					
6	33	2	7	Serum injected in one axilla, virus in the other	Slight temperature reaction
7	33	2	7	Serum injected into axilla, virus through same needle, same place	Hog cholera
8	31	2	7	Serum mixed with virus 30 minutes and injected into axilla	Hog cholera
January 29, 1924					
101	106	1	10	Serum injected in one axilla, virus in the other	Slight temperature reaction
102	92	1	10	Serum injected into axilla, virus through same needle, same place	Hog cholera
103	103	1	10	Serum mixed with virus 40 minutes and injected into axilla	Hog cholera
104	82	1 3-mm loop	10	Mixed for 20 minutes and 2 cc injected into axilla	Hog cholera
120	106	2		Virus injected into axilla	Hog cholera
121	71	2		Virus injected into axilla	Hog cholera

recovered quickly. February 11, 1924, pigs 1, 2, and 3 were given 2 cc of virus alone to test their immunity. Temperatures were taken daily for one week. No rise occurred. They remained well. The trial injections are not included in the tables.

On August 22, 1923, I continued the experiment, using about the same sized shoats with the same dose of virus (2 cc), but decreased the dose of serum used on August 15, from 10 cc to 7 cc. Pig 6 was given the serum and virus by the simultaneous method; pig 7 was given serum and virus through the same needle and pig 8 received the mixture (see table IV-B). Pigs 7 and 8 sickened with cholera promptly while pig 6 remained well, indicating clearly the superiority of the simultaneous method over the other two that were used. Pig 6, which survived this experiment, was also given 2 cc of virus on February 11, 1924, and remained well.

On January 29, 1924, I injected a group of larger shoats. They were of sufficient weight to give the same results with the 10-cc dose of serum that were observed with the 7-cc dose used in the group injected August 22. It will be seen in table IV-B that here again the animal which received the serum in one axillary space and the virus in the other withstood the vaccination while the animals receiving the same dose of serum and virus by the other two methods sickened with cholera. The animal that survived, No. 101 in the last group, was later exposed to hog cholera virus and found to have a permanent immunity.

Changing the proportions of virus and serum in the three groups seemed to make no difference but it is indicated clearly that the method of injecting the virus at one place and the serum at another is more efficient than when they are mixed. This difference might not be noticed in practice where much larger doses are used but in the small doses used in this experiment, where the breaking point of the serum was reached in order to test the methods, the results were as just described. Further experiments are being made on a stock serum and virus mixture.

3. Artificial Hog Cholera Virus

If some way can be found to decrease the cost of virus, which must be used in large quantities in hyperimmunizing and in considerable quantities in the simultaneous treatment, a long step will have been taken towards lowering the cost of vaccinating. It has seemed to me that the most likely way to accomplish this is to discover some method by which the virus pig can be

saved. At present we are compelled to produce cholera in large numbers of shoats, thus converting them from valuable stock hogs or feeders into a worthless by-product of serum production. Meyer,[11] Proescher and Seil[12] and others have experimented in various ways with hog cholera virus. We know that when it is introduced into the body of a hog that has not had the disease or been immunized against it, it soon causes sickness and death. Otherwise so little is known of the properties of virus that it is impossible to say how it acts in the blood and other tissues.

On March 9, 1923, an experiment was begun for the purpose of studying the action of virus when introduced into susceptible serum and incubated at 37°C. Two susceptible shoats were tail-bled in vacuum. The blood from one was defibrinated by shaking, and strained through sterile cheesecloth. It was then placed in sterile tubes, 20 cc in each tube. A 3-mm. loop of stock virus was mixed into 20 cc of the susceptible blood while it was still warm. This was incubated for 24 hours at 37°C. A 3-mm. loopful from the first tube was then transferred to a second tube which had been kept on ice. This was incubated for 48 hours. Four more transfers were made and each incubated for 48 hours. The sixth and last transfer made was incubated for 72 hours on account of trouble with the incubator. Two tubes of the same blood, without the virus, were incubated each time to study the physical changes, should any occur. None of the latter was noticed. Two cubic centimeters from the seventh tube of blood incubated was injected into a susceptible shoat (No. 96) weighing 60 pounds, kept in what I supposed was a hog cholera-free pen. He developed cholera slowly and was killed for virus on the twelfth day. This experiment was not pen-checked with susceptible pigs and I am inclined to believe that, due to its slowness in developing symptoms, this pig got an infection from the pen rather than from the injection.

More recently I have run a checked incubation experiment on susceptible blood; susceptible blood, carbolized with 10% of a 5% solution of carbolic acid; immune blood; and hyperimmune blood. Seven transfers were made in the last experiment instead of six as in the first. All transfers were incubated 48 hours at 37°C. Two cubic centimeters were taken from the eighth tube of each of the four sera and injected into susceptible shoats. No sickness occurred. The shoats have been tested and found to be susceptible to hog cholera. To check the transfers which were being incubated in the last experiment, I ran seven transfers

through the same day with the same susceptible serum and same stock virus which were used in the tubes that were incubated. Two cubic centimeters from each of the four sera were taken and injected into susceptible shoats. They remained well and were found to be susceptible upon later exposure to virus. These experiments indicate that virus in these various sera, incubated at 37°C., does not increase and that, in the series of six and seven transfers of one 3-mm. loopful into 20 cc of serum, the virus is lost.

The blood from the other susceptible shoat bled on March 9 was shaken to defibrinate. One 3-mm. loopful of stock virus was then introduced into 500 cc of the serum. This dilution was left standing at room temperature, about 55° to 60°F., for 48 hours. Two cubic centimeters were then injected into a susceptible shoat (No. 94) weighing 60 pounds. The shoat sickened the fourth day, was killed for virus the sixth day and showed hog cholera lesions. Not having injected a susceptible shoat on the day the dilution was made, there was no way to tell whether the virus had increased or whether cholera in shoat 94 had been caused by the original virus-serum mixture.

On January 29 I repeated the same susceptible serum experiment with checks and by the same method experimented with immune blood, hyperimmune blood and hyperimmune blood carbolized (stock anti-hog cholera serum). One 3-mm. loopful of stock virus was introduced into 500 cc of each of the sera just mentioned. Two cubic centimeters from each of these four dilutions were injected into the axillae of shoats weighing from 68 to 131 pounds. Two susceptible shoats were each given 2 cc of the stock virus to test its potency. The experiment is shown in tables V-A, V-B, V-C, V-D and V-E.

TABLE V-A—*Group receiving bloody serum from 150-pound susceptible shoats Dilution: 1 3-mm. loop of virus in 500 cc of serum*

PIG NO.	WT. (LBS.)	DATE OF INJECTION	DOSE—2 CC	1ST RISE IN TEMPERATURE	HIGHEST TEMPERATURE	RESULTS
105	98	1–29–24	As soon as mixed	4th day —7.4	4th day —7.4	10th day—dead. Cholera
112	72	1–30–24	After 24 hrs. at room temperature	3rd day —7.6	3rd day —7.6	2-5-24—received 360 cc hyper. serum intrav Recovered
116	76	1–31–24	Room temp. 24 hrs. Ice—24 hrs.	4th day —4.7	6th day —7.0	15th day—dead. Cholera

TABLE V-B—*Checks on virus*

PIG NO.	WT. (LBS.)	DATE OF INJECTION	DOSE OF VIRUS	1ST RISE IN TEMPERATURE	HIGHEST TEMPERATURE	RESULTS
120	106	1–29–24	2 cc	4th day —4.0	6th day —7.4	2-4-24—Killed for virus Cholera
121	71	1–29–24	2 cc	4th day —4.7	6th day —7.5	2-4-24—Killed for virus Cholera

TABLE V-C—*Group receiving bloody serum from 350-pound cholera immune Dilution: 1 3-mm. loop of virus in 500 cc of serum*

PIG NO.	WT. (LBS.)	DATE OF INJECTION	DOSE—2 CC	1ST RISE IN TEMPERATURE	HIGHEST TEMPERATURE	RESULTS
106	131	1–29–24	As soon as mixed	22nd day —4.2	24th day —8.2	Given hyper. serum. Chronic cholera. Recovered
113	78	1–30–24	Room temp. 24 hrs.	14th day —5.2	17th day —7.2	18th day—dead. Cholera
117	68	1–31–24	Room temp. —24 hrs. Ice —24 hrs.	4th day —4.7	8th day —6.5	10th day —dead. Cholera.

TABLE V-D—*Group receiving bloody serum from hyperimmune No. 463 Dilution: 1 3-mm. loop of virus in 500 cc of serum*

107	114	1–29–24	As soon as mixed	23rd day —4.1	24th day —7.8	31st day—dead. Cholera
114	78	1–30–24	Room temp. —24 hrs.			Remained well
118	80	1–31–24	Room temp. —24 hrs. Ice —24 hrs.			Remained well

TABLE V-E—*Group receiving bloody serum from stock series "E"—Carbolized 10% of a 5% solution. Dilution: 1 3-mm. loop of virus in 500 cc serum*

108	124	1–29–24	As soon as mixed	16th day —3.6	23rd day —8.4	30th day—dead. Cholera
115	75	1–30–24	Room temp. —24 hrs.	7th day —3.6	13th day —8.1	28th day—dead. Cholera
119	92	1–31–24	Room temp. —24 hrs. Ice —24 hrs.	12th day —5.0	19th day —6.5	21st day—dead. Cholera

The results of this experiment could be made the basis for endless theories. It was evident that one loopful of virus in 500 cc of susceptible blood, when injected into susceptible shoats in 2-cc doses, had a markedly different effect than when the same proportion in the same doses of virus and immune blood and virus and hyperimmune blood, uncarbolized and carbolized, were used. Further work was planned to learn if the virus would increase in susceptible blood *in vivo* and *in vitro* and if it could be used instead of virus bled from pigs sick of the disease.

Since the quality of hyperimmune serum which a given virus will produce is a practical test of the virus, it was decided to mix a small quantity of virus with a large quantity of susceptible serum and hyperimmunize hogs with the mixture, figured on the live weight of the animal, 5 cc per pound, and injected intravenously as is done in the standard method of producing anti-hog cholera serum. The mixture of virus and serum was used in two ways: one hog was hyperimmunized the same day the virus was introduced into the serum, and the other hog was hyperimmunized the next day, after the mixture had stood at room temperature for 24 hours.

In order to run a parallel experiment *in vivo*, I injected a susceptible hog intravenously with a small quantity of virus, tail-bled the animal, and injected it with a full dose of anti-hog cholera serum before releasing it from the crate. On the same day I injected a second susceptible hog intravenously with a small quantity of virus and the next day, 24 hours after the intravenous injection, he was crated, tail-bled, and before being released from the crate, given a full dose of anti-hog cholera serum by deep injection into the side of the neck. By this process these animals were to supply me with susceptible blood for the experiment and by giving them anti-hog cholera serum they were converted from susceptibles into immunes, to be hyperimmunized later, in the regular process of serum production. The advantages of such procedures are obvious, for whether the blood for the experiment *in vitro* be obtained by tail-bleeding or by throat-bleeding a susceptible hog, the carcass could still be used for food, while in the process *in vivo*, as said before, the animal could be used later as a hyperimmune.

February 28, 1924, three susceptible hogs were tail-bled, each weighing about 150 pounds. Each bleeding was shaken about two minutes to defibrinate. One cubic centimeter of stock virus, bled on February 5, was added to each bleeding regardless of the

quantity of the blood, and the dilution shaken one minute. When the three bleedings were strained and measured the proportions of virus to serum were found to be about 1 to 800. These proportions were approximate because some serum remained in the clot.

The same day, February 28, the virus-serum just prepared was injected intravenously into shoat 126, weighing 126 pounds. Five cubic centimeters per pound live weight was used (see table VI). This pig had been immunized by the regular simultaneous method on January 29, 1924. February 29, hog 127, weighing 200 pounds, which had been immunized August 15, 1923, was given 5 cc per pound of the 24-hour inoculation of virus in serum intravenously.

As a preliminary experiment *in vivo* I injected 1 cc of fresh, uncarbolized, defibrinated virus intravenously into a susceptible

TABLE VI—*Virus (V) and susceptible serum (SS)*

HOG	INOCULATIONS	WEIGHT (LBS.)	DATE	INTRAVENOUS INJECT. (CC)	BLEEDINGS	DATES OF TESTS
			IN VITRO			
No. 126 Short-time immune	1 cc V to 800 cc SS. SS Tail-bled 2-28.	126	2-28	360	3-11, 18, 25.	3-28 4-3
	1½ cc V to 1300 cc SS. SS Throat-bled 4-3	142	4-3	355	4-14, 21, 30. 5-8 throat-bled	5-15 6-13
No. 127 Long-time immune	1 cc V to 800 cc SS. SS Tail-bled 2-28.	200	2-29	1000	3-11, 18, 25.	3-28, 4-4, 5-23
	1½ cc V to 1300 cc SS. SS Throat-bled 4-3	213	4-4	533	4-14, 21. Injured. 5-8 throat-bled	5-15 6-13
No. 138 Long-time immune	1½ cc V to 1300 cc SS. SS Throat-bled 4-3.	210	4-3	1050	4-14, 21, 30, 5-8.	6-20
	2 cc V to 1325 cc SS. SS Throat-bled 5-8	231	5-8	577½	5-22, 28, 6-5. 6-11 throat-bled	
No. 142 Long-time immune	17 cc V to 1700 cc SS. SS Throat-bled 5-28.	267	5-29	1335	6-11, 19, 27, 7-3	7-11
			IN VIVO			
No. 131A Short-time immune	1 cc V to 245-lb. hog 3-7. Tail-bled 3-7.	105	3-7	525	3-18, 25.	3-28, 4-3, 12
	2 cc V to 130-lb. hog 4-18. Tail-bled 4-18.	132	4-18	330	4-30, 5-8 15. 5-22 throat-bled.	6-20
No. 132A Long-time immune	1 cc V to 280-lb. hog 3-7. Tail-bled 3-8.	185	3-8	925	Died 48 hours after hyper-immunizing.	
No. 141 Long-time immune	2 cc V to 145-lb. hog 4-18. Tail-bled 4-19.	225	4-19	1125	4-30, 5-8, 15, 22.	Not tested.
	17 cc V to 166-lb. hog 5-28. Tail-bled 5-29.	260	5-29	650	6-11, 19, 27. 7-3 throat-bled.	7-11

shoat (No. 128) weighing 50 pounds. Sixteen minutes after the injection, the pig was tail-bled, the blood defibrinated, and 1 cc injected subcutaneously into a susceptible shoat (No. 129)

weighing 50 pounds. In 24 hours shoat 128 was tail-bled again and another susceptible shoat (No. 130) was injected subcutaneously, with 1 cc of the defibrinated blood. Shoat 128 became sick with cholera the fourth day and was killed for virus the fifth day. Shoats 129 and 130 became very sick with chronic cholera but recovered. This showed that the blood of the 50-pound susceptible shoat (No. 128) was virulent enough, both 16 minutes after and 24 hours after the intravenous injection, to cause sickness but not death in shoats 129 and 130.

On the strength of this, an experiment was started with the object of producing potent virus *in vivo*. March 7, 1924, two susceptible hogs (No. 131, weighing 245 pounds, and No. 132, weighing 280 pounds) were injected intravenously with 1 cc of freshly bled uncarbolized virus. Hog 131 remained in the crate 30 minutes when it was tail-bled and then given 80 cc of anti-hog cholera serum by deep injection into the side of the neck. The blood tail-bled from hog 131 was used on shoat 131A, weighing 105 pounds, immunized January 29, 1924. The hyperimmunizing was done by injecting 5 cc per pound live weight intravenously. At the same time an injection of 1 cc was made subcutaneously into a susceptible shoat (No. 131B) weighing 60 pounds. The temperature of this shoat rose the fifth day after injection, it went off feed the sixth day, ate very little until April 2, when it died of chronic hog cholera. This showed that the tail-bleeding from hog 131, used for hyperimmunizing No. 131A, was virulent.

The next day, March 8, hog 132 was tail-bled and given 80 cc of anti-hog cholera serum by deep injection into the side of the neck before being released from the crate. This bleeding was done at 11:30 a. m. The defibrinated blood was set in ice water until 2 p. m., when it was strained and hog 132A, weighing 185 pounds, was given 5 cc per pound live weight intravenously. This hog showed distress immediately after hyperimmunizing, did not eat the evening feed, drank a little water the next day, and died 48 hours after hyperimmunization. Hemorrhages were found on the bladder and kidneys. Some of the hemorrhages were larger than are seen in hog cholera, while others were typical of cholera. This animal was a long-time immune, having been immunized August 22, 1923, and its immunity tested by injecting 2 cc of virus alone Feb. 11, 1924. I therefore think it died from the shock of the intravenous injection rather than from disease produced by it.

Shoat 132B, weighing 70 pounds, was injected with 1 cc subcutaneously at the same time hog 132A was hyperimmunized and with the same blood. The shoat became sick with cholera and died April 8, of chronic hog cholera, exactly one month after the injection.

It will be seen in table VI that the experiment on a short-time immune (No. 126) was repeated on a long-time immune (No. 138). Shoat 126 had been immunized January 29, 1924, and was therefore immune for one month when used in this experiment. Hog 138 was immunized August 15, 1923, and experimentally hyperimmunized April 3, 1924, therefore had been immune for about 7½ months. The proportions of virus in susceptible serum were also different. With No. 126, 800 cc of serum, tail-bled from susceptible hogs, was inoculated with 1 cc of virus, while that which was used on No. 138 was in the proportion of 1.5 cc of virus to 1300 cc of the susceptible serum collected by throat-bleeding.

The difference in the length of immunity is mentioned because of evidence that the long-time immune, when hyperimmunized, produces a more potent serum. The difference in proportion occurred unintentionally because of introducing the virus into the susceptible serum before the serum was strained and measured. It is not likely that tail-bleeding the susceptible blood in the one case and throat-bleeding it in the other would influence the quality of serum produced.

On No. 142 in this group the same method was used as has been described for No. 127. The susceptible serum was inoculated with the virus soon after bleeding, let stand at room temperature, 50° to 60°F., for 24 hours and No. 142 injected intravenously with 1335 cc (5 cc per pound live weight). As will be seen, a marked difference was made in the quantity of virus introduced into the susceptible serum given No. 127 and that given to No. 142. The proportion used on No. 127 was 1 cc of virus to 800 cc of susceptible serum, while on No. 142 it was 17 cc of virus to 1700 cc of susceptible serum, the latter being nearly a 1 per cent dilution. This increase was made because of results from early tests which will be described later.

The experiment with No. 131A, described already as an attempt to hyperimmunize with blood tail-bled from a susceptible the same day the latter had received a small dose of virus intravenously, has not been repeated.

The experiment attempted with No. 132A (died from shock)

was repeated on No. 141 except that the dose of experimental virus was increased and no susceptible shoats were injected subcutaneously as a check on the virulence of the virus.

The Dorset-Niles method of producing stock anti-hog cholera serum was applied to the experimental serum. The experimentally hyperimmunized hogs were bled 10 to 12 days after being subjected to the hyperimmunizing process, then three more times at weekly intervals, rehyperimmunized, tail-bled again in 10 to 12 days and twice more at weekly intervals. A week later the animal was throat-bled. Immediately after the blood was collected it was shaken for the purpose of defibrinating, strained through sterile cheesecloth, bottled in sterile bottles, and carbolized with 10 per cent of a 5 per cent solution of carbolic acid.

Tests were made by taking samples of all bleedings to date from each experimentally hyperimmunized hog and various doses injected into susceptible shoats simultaneously with 2 cc of virus. The standard of potency which I hold as being necessary for anti-hog cholera serum is for 10 cc of the serum to protect a 50- to 70-pound pig against 2 cc of potent virus.

The dates the tests were begun on the experimental serum, also the dates of the bleedings tested, the weights of the test pigs, the dose of the virus and the dose of serum given to each susceptible shoat, with the results, are shown in table VII.

Dosage used on test pigs ranged from 10 cc to 80 cc. The only test that showed indications of being satisfactory at all was the one begun July 11 on the serum from experiment hyperimmune 142. There were four 80-pound shoats in the test. Each received 2 cc of a potent stock virus, one received at the same time 30 cc of the experimental serum from No. 142, another 60 cc, another 80 cc, and another no serum at all. The one receiving virus alone had a temperature of 106.6°F. the fourth day after injection, 108.0°F. the fifth day, was killed for virus the seventh day and showed cholera lesions. The pigs receiving the serum showed slight temperature reactions but no other clinical symptoms. The test on the serum from No. 141 showed some protective qualities, since the pigs receiving 40 and 80 cc of the serum survived while the one that received 20 cc died of cholera.

From observations made and just described it seems to me probable that a serum of standard potency can be produced without sacrificing pigs. For example, in the work done by Dorset, McBryde and Niles[1] on the curative value of serum, it has been shown that a healthy hog can be given serum three or

TABLE VII—*Tests on experimental serum*

HYPER-IMMUNE	BLEEDINGS TESTED	DATE OF TEST	WT. OF TEST PIG (LBS.)	DOSE OF VIRUS (CC)	DOSES OF SERUM (CC)	RESULTS
			IN VITRO			
126	3–11, 18, 25	3–28–24	60	2	10	Cholera
			60	2		Cholera
	All	5–15–24	30	2	10–15–20	Cholera
			30	2		Cholera
	All	6–13–24	40	2	20–30–40	Cholera
			40	2		Cholera
127	3–11, 18, 25	3–28–24	60	2	10	Remained well
			60	2		Cholera
	All	5–15–24	30	2	10–15–20	Cholera
			30	2		Cholera
	3–11, 18, 25	5–23–24	50	2	10–10	Cholera
			50	2		Cholera
	All	6–13–24	50	2	20–30–40	Cholera
			50	2		Cholera
138	All	6–20–24	60	2	20–40–80	80 cc protected; 20 cc, 40 cc did not protect
			60	2		Cholera
142	6–11, 19, 27, 7–3	7–11–24	80	2	30–60–80	Remained well
			80	2		Cholera
			IN VIVO			
131A	3-18, 25	3–28–24	60	2	10	Cholera. Recovered
			60	2		Cholera
	All	6–20–24	60	2	20–40–60	Cholera
			60	2		Cholera
141	6–11, 19, 27, 7–3	7–11–24	80	2	20–40–80	40 cc, 80 cc protected; 20 cc did not protect
			80	2		Cholera

four days after receiving an injection of virus and the animal saved.

It seems reasonable to believe that a virus *in vivo* three days would be more potent than the ones *in vivo* 24 hours such as I experimented with on hyperimmunes 131A and 141. Whiting,[13] in experimenting on the virulence of hog cholera blood at different periods during the disease, drew blood from virus pigs daily, beginning with the fifth day after inoculation, and found that the virulence increased from the fifth to the eighth day. Similar tests, run from the first to the fourth day, would be vitally concerned in attempting to produce virus *in vivo* but I have not been able to find records of such tests and have not had time to make them myself. For the same reason I have not tried incubation experiments with cholera blood under anaerobic conditions, which might yield more promising results, nor have I run check tests on the protective power of the blood of immunes before being experimentally hyperimmunized.

If an anti-hog cholera serum of standard potency can be produced by introducing virus into blood from susceptible hogs *in vitro* or *in vivo* and this inoculated blood used for hyperimmunizing, it will be necessary of course to administer the same quantity used in the inoculation on immunes to compare the quality of the sera produced; but until a serum of standard potency is produced experimentally, I have not thought the risk of losing more test pigs justifiable.

The data on virus given here is a presentation of problems unsolved. It is plainly seen that virus in susceptible serum acts differently than virus in immune and hyperimmune serum when injected in small doses into susceptible shoats, as shown in tables V-A, V-B, V-C, V-D and V-E. It is not known whether this difference is due to changes in the virus or the various sera, or both, because of physical, chemical or biological processes singly or combined before or after injection. The nature and significance of the phenomenon require further study.

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Discussion

Dr. W. B. Niles: Dr. Benner has certainly given us a most interesting paper on a very important subject. While we do not consider that vaccination is a very expensive proposition for the farmer, his bill, of course, is quite heavy if he has a large number of hogs, so I think it is quite pertinent that we be able to reduce the cost of vaccination, if it is possible to do it.

Those of us who are in the Biochemic Division, and Dr. Dorset especially, have been exceedingly anxious, for a number of years, to do some work that would lessen this cost of vaccination. We have done quite a lot of work along various lines, some of which has been mentioned in Dr. Benner's paper.

In regard to the vaccination of young pigs, we have done considerable work along that line. I think some of you may recall that there was published in the Journal of this Association—I believe it was in 1918—a report on some work done by Dr. Rietz and myself, in the vaccination of *very* young pigs.

In this work, we vaccinated something like 180 young pigs. Nearly one-half of these were pigs farrowed on the Station premises and the vaccination was done at the age of from seven to fifteen days. None of those from near-by farms were over six weeks of age. The dose in all these young pigs of that age was 10 cc of serum and one-half cc of virus. The serum dose was divided between different regions, some given in the axilla and some in the loin, and the virus was injected into the ham. Some litters were from immune mothers, the same as the pigs in Dr. Benner's experiments, and some from susceptible sows.

No ill results followed the use of the simultaneous treatment on these young pigs; they all remained well. During the interval between vaccination and exposure to cholera a few died but a large majority lived, and these were exposed five months later to a virus injection of five cubic centimeters. Three out of the bunch died. We endeavored to prove that two of these had hog cholera by injecting blood from them into susceptible shoats, but as the susceptible shoats remained well, we made up our minds that those two did not die from hog cholera. The third pig on which we made no test of the blood did not show hog cholera lesions.

At various times we have tested, by virus injections, a lot of young pigs from immune mothers, the same as Dr. Reynolds and Dr. Benner have done, and we got the same results. That is, we found that quite young pigs, from immune mothers, will stand a good dose of virus, but we also found that if not exposed while young, the inherited immunity is eventually lost and consequently we have not considered that you can take into very much account, in field work, the immunity inherited by pigs from immune mothers. I would recommend vaccinating pigs from immune mothers and susceptible mothers in exactly the same way.

The Animal Husbandry Division of the Bureau has a number of farms on which they are raising their own pigs for various experiments, and last year—1923—Dr. Dorset and Dr. Huntley had an opportunity of vaccinating many of these pigs while they were young. Dr. Dorset sent me, the other day, some data on this work which he expected to present if able to be present.

There were six of these farms; one located at Beltsville, Md., one at Ardmore, S. D., one at Newell, S. D., one at Huntley, Montana, one at McNeill, Miss., and one at Jeanerette, La. Altogether they vaccinated 2,424 young pigs. The average age of these pigs was six weeks, some were younger and some slightly older; all remained well following vaccination. Nine hundred thirty of these pigs were exposed later to a virus injection, and sixteen died. Nearly all of these deaths occurred on one farm—the one at McNeill, Miss. The Doctor states in his notes that there were forty-three shoats exposed on the McNeill farm, twelve of which died, which you see is quite a large per cent. He states that some of these forty-three pigs were showing symptoms of hog flu at the time the virus injection was made and that most of them were heavily infested with worms. He states that these twelve undoubtedly died with hog cholera, but he thinks that the worm infestation and the hog flu had something to do with the deaths of these animals, probably by lessening their resisting powers.

I believe it is pretty well conceded now, that you can successfully vaccinate

young pigs. I believe, if I understood Dr. Benner's paper right, he did not use susceptible pigs in any of his experiments, but they were all pigs from immune mothers. Now I believe that you can just as successfully vaccinate the pigs from susceptible mothers at that age as you can pigs from immune mothers.

The work with mixed serum and virus done by Dr. Benner is interesting and along the line on which the Bureau did some work in 1916, and later in 1920.

In order to cheapen the process of vaccination by the use of mixed serum and virus, it is necessary to use either a less amount of serum than is at present used or to conserve the time of the vaccinator and his assistants. By mixing serum and virus and using it immediately, you would, of course, save some time in vaccinating the herd, but I doubt whether the veterinarian would want to cut his price very much by simply doing that. However, if you can, by the process of mixing serum and virus, lessen materially the amount of serum used, you can cheapen the vaccination.

I note that Dr. Benner's experiments were made soon after mixing the serum and virus. In almost all of our work we prepared the sero-vaccine, as Dr. Dorset terms the serum and virus mixture, by mixing the serum and virus in certain proportions and letting it stand for some time before using, the idea being that by standing in contact with the serum, some attenuation of the virus takes place. If this be true a smaller dose of serum can be used and thereby some saving would be effected.

We made our first experiments in 1916, by using small doses—three cubic centimeters of the mixture in one dose and six cubic centimeters in another. I might say in most of these experiments you will need to use a comparatively small dose, as a medium dose will protect most animals. I think we all recognize that in field vaccination we use much more serum than is needed in most herds. We use these large doses of serum in our vaccinations because we do not know which pigs are—what you might term—hypersusceptible, and to get by without trouble in all these herds, we have increased our dose of serum until it seems to me that our commercial friends are recommending some *really very large doses* of serum.

To make this discussion short, I will say that we found, in these preliminary experiments, that sometimes sickness would follow the injection of our mixture and that other pigs would remain well, but later, when these pigs were exposed to a virus injection, they would succumb—that is, some would get sick following the injection of the mixture, others would remain well, and after three or five months would succumb to the injection of virus, showing quite irregular results.

We did not continue that work until 1920, when additional experiments were made. Dr. Dorset still had the idea that we ought to cheapen the process of vaccination. In starting the work again we made a batch of what we termed the sero-vaccine and used it on sixty shoats of about the size that are ordinarily vaccinated in the field—weighing from forty-five to seventy pounds. They were divided into several lots and sero-vaccine used in doses of ten and twenty cubic centimeters at the end of two, four, six, twelve and sixteen weeks after mixing, twelve pigs being injected at each interval.

Again we got very irregular results. As I said before, some pigs sickened following the injection of the mixture and some remained well; some of those that remained well would succumb to the virus injection three months later, showing, I think, that there had been an attenuation in the virus and that this attenuated virus would make some very susceptible animals sick and others would not be rendered immune.

I may say that this has been the result in all our attempts to attenuate hog cholera virus—that is, a virus, attenuated to a point where it will be a vaccine for some hogs, will make sick and kill other more susceptible hogs. On account of this varying susceptibility of different hogs to hog cholera, none of the methods tried for attenuating virus has proven practical.

In regard to Dr. Benner's method of cheapening immunization by the use of an artificial virus, we have not done any work along that line. In all our numerous attempts at cultivating hog cholera virus outside the body of

the hog, we have found it rather hard to determine whether the virus actually grew or not, as an exceedingly small amount of virus in culture media will engender cholera in a very susceptible shoat. In a series of tests to determine the minimum fatal dose of hog cholera virus, we found that pigs will quite readily sicken when injected with one one-hundred-thousandth of a cubic centimeter of good virus. Consequently the control culture medium must contain a very small amount of virus or it will cause hog cholera without any artificial growth of the virus.

So I say it is not easy to determine that you have actually grown the virus and I do not know that Dr. Benner can say that he actually grew hog cholera virus artificially.

STOCKYARDS VACCINATION

We give herewith a copy of a resolution adopted by the United States Live Stock Sanitary Association, December 5, 1924. This resolution has since been endorsed by quite a number of other associations:

> "RESOLVED, That the United States Live Stock Sanitary Association now in session recommends that all vaccination of live stock in public stockyards be done only by qualified veterinarians and under the direct supervision of the Federal Bureau of Animal Industry."

ON THE WAY TO PORTLAND

Mount Index in the Cascade range. Great Northern Railroad.

BOVINE INFECTIOUS ABORTION—PREVENTION AND CONTROL[1]

By M. F. BARNES, *Harrisburg, Pennsylvania*

Pennsylvania Bureau of Animal Industry

Abortion disease of cattle caused by *Bacillus abortus* (Bang) is daily arising to a more important position among the diseases to which live stock are susceptible. Cattle owners are realizing more and more its handicap to the improvement of the various breeds of cattle; also the tremendous economic loss from the standpoints of herd efficiency and milk and beef production.

Not until after the problem has been analyzed from the standpoint of individual losses can one comprehend the magnitude of the total loss in a fair-sized herd in which this disease is defeating the purpose for which that herd is maintained. The efficiency of such a herd, compared with that of a herd of about the same size, not infected, but kept under similar conditions, reveals the enormous total loss to the former.

Numerous breeding establishments can be pointed to which have gone into bankruptcy for no other reason than the loss sustained as a consequence of bovine infectious abortion.

The veterinary profession has been justly criticized for its neglect to devise proper methods for prevention and control of this disease. On the contrary, some breeders realize and appreciate the fact that the adoption of certain measures, which the profession has recommended, is of benefit to them. Some would go out of business before they would permit themselves to lapse into former methods.

Those veterinarians and breeders who continue to look forward to the discovery of a remedy or cure by some person who has no conception of the exact nature of animal diseases, it is my opinion, will remain in darkness so far as the control of bovine infectious abortion is concerned.

Most modern breeders, however, realize that a successful live stock industry is dependent upon the health of that industry. One who is prominent among breeders expressed the views of a number of others when he made the statement: "When you have a corpse, bury it." He also made the statement that, some day, he hoped to get back into the business, and when he did,

[1]Presented at the sixty-first annual meeting of the American Veterinary Medical Association, Des Moines, Iowa, August 19-22, 1924.

he would start with a small herd of young stock, all coming from tuberculosis-free accredited herds and all being negative to the blood test for abortion. He would see the whole breed in Hades before he would again have anything to do with a herd with infectious abortion in it. "Records do not mean anything when coupled with abortion and tuberculosis."

The experiences of the above breeder, who has gone out of business, would indicate that little was left untried. Others likewise have taken up a fight against the disease with all serious intention of wiping it out, only to learn that after most all advertised remedies and cures had been tried, none would accomplish the desired end. Our profession certainly should adopt some definite policy, or should advise stockmen more uniformly with reference to proper methods for combating this disease.

Some useful facts have been brought to light during recent years. The valuable pieces of work have been subjected to too much comment and criticism by those who know no more, and possibly less, about this little understood disease than those who have attempted to add some useful facts to our meager knowledge.

My purpose in this presentation is not to review the literature on this subject, not to add to, detract from, or comment upon statements made by others engaged in a study of this disease. The purpose is to discuss prevention and control of bovine infectious abortion. Facts presented are based on personal experience.

The use of vaccines has been well thrashed out in our literature. A number of breeders have fully realized its failure to protect them from losses. The conflicting results obtained by different experimentors are sufficient to hold its use in abeyance as experimental. In any herd with which I have come in contact, where vaccine has been used, I have failed to comprehend any useful results derived therefrom.

It is not fair to presuppose that the injection of the cause of any disease into an animal will produce a lasting immunity, when an attack of the disease itself does not establish immunity. Immunity has been successfully established artificially against many of the diseases which run an acute course, but for those diseases, the course of which generally is not acute, there has been little accomplished.

That permanent immunity against Bang abortion disease in cattle is not established by an attack of the disease is proved by

the fact that a rather high percentage of animals shows the most characteristic symptom by aborting the second, third, and even the fourth and fifth times.

One hundred and eight cows in one herd (herd 2), showing a record of two or more conceptions per cow, with an average of 4, and covering an average period of approximately 5½ years, 116 conceptions (27%) resulted in abortions and 316 in normal births.

The 116 abortions occurred in 73 (67.5%) of the 108 cows. Of the 73 cows which aborted:

41 (56%) aborted only once
32 (44%) aborted more than once
25 (34%) aborted two or more consecutive times
5 (7%) aborted three or more consecutive times
3 aborted four or more consecutive times
1 aborted five consecutive times
1 aborted once, then gave birth to five normal calves, and then aborted once more
4 aborted once, then gave birth to one normal calf, and then aborted once more
2 aborted once, then gave birth to one normal calf, and then aborted two consecutive times.
2 aborted once, then gave birth to two normal calves, and then aborted once more.

Sixty cows in other herds showed a record of two or more conceptions per cow, or a total of 178 conceptions; 51 of these conceptions resulted in abortion, and 127 resulted in normal births. The 51 abortions occurred in 36 cows, and 14, or approximately 40% of the 36 cows, aborted more than once.

The results of vaccination which we have obtained do not indicate, in face of other measures properly executed, that our state or any other at this time is justified in advocating the general use, in living form, of the cause of this destructive disease.

This work on vaccination was done officially, under practical field conditions. All herds in which vaccine was used were visited at frequent intervals. The herd records were made available, and all data collected with reference to the breeding of animals were reliable. A swelling occurred at the point of inoculation, which answered the description given by Theobald Smith in a report of his work on vaccination. Abscesses did not occur at the point of inoculation. This work, except in parts, has never been published, because we have believed that it would not add useful knowledge to the proper method of prevention and control of bovine abortion.

Vaccinations were carried out in 10 badly infected herds in

several sections of the state. A diagnosis of bovine infectious abortion was established definitely before vaccinations were begun. The herds had been infected for periods ranging from one to fifteen years.

The work was carried over a period of about two and one-half years, from the middle part of 1920 until about the first of the year 1923, which gave time for the periods of gestation of cows which were vaccinated on the latest date, September 22, 1921.

During the period of vaccination, there was a total of approximately 275 animals vaccinated, and approximately 250 animals were left as controls.

One of the herds in which we were doing work went into bankruptcy, and the cattle were sold at a dispersal sale. A number of animals in the other herds were sold, died, or did not conceive in time properly to be considered in determining the final results.

The accompanying tables include only the cows in the several herds which were bred not before sixty days subsequent to vaccination and which conceived within a reasonable time after the sixty days had elapsed.

TABLE I—*Animals vaccinated and controls—All histories not known*

	Number of Animals	Calved Normally		Aborted	
		Number	%	Number	%
Vaccinated	187	137	73.3	50	26.7
Controls	143	108	75.5	35	24.5

The exact history of all animals in table I is not known, but for those the history of which is known, table II shows the

TABLE II—*Animals vaccinated and controls—Histories known*

	Previously Aborted	Number of Animals	Calved Normally		Aborted	
			Number	%	Number	%
Vaccinated	Yes	54	37	68.5	17	31.5
	No	133	100	75.2	33	24.8
Controls	Yes	26	20	76.9	6	23.1
	No	83	66	79.5	17	20.5

results of two classes, cows that had previously aborted and cows that had not previously aborted.

A number of the animals were blood-tested previous to vaccinations. Table III indicates the animals that were positive and those that were negative to the blood test.

TABLE III—*Data on blood tests and abortions*

		Number of Animals	Calved Normally		Aborted	
			Number	%	Number	%
Negative to blood test.....	Vaccinated	82	63	76.8	19	23.2
	Controls	45	37	82.2	8	17.8
Positive to blood test.....	Vaccinated	81	58	71.6	23	28.4
	Controls	35	26	74.5	9	25.5
Negative to test and no previous abortions.....	Vaccinated	82	63	76.8	19	23.2
	Controls	44	36	81.8	8	18.2
Positive to test and previous abortions.....	Vaccinated	50	36	72.0	14	28.0
	Controls	21	15	71.5	6	28.5
Positive to test and no previous abortions.....	Vaccinated	31	22	71.0	9	29.0
	Controls	14	11	78.6	3	21.4

A number of the vaccinated and control animals were virgin heifers. The virgin heifers which were employed in the vaccination experiments are shown in table IV.

TABLE IV—*Results of vaccination of virgin heifers*

		Number of Animals	Calved Normally		Aborted	
			Number	%	Number	%
Negative to blood test.....	Vaccinated	54	39	72.2	15	27.8
	Controls	20	14	70.0	6	30.0
Positive to blood test.....	Vaccinated	10	6	60.0	4	40.0
	Controls	8	6	75.0	2	25.0
Blood not tested.....	Vaccinated	7	4	57.1	3	42.9
	Controls	14	12	85.7	2	14.3
Totals.....	Vaccinated	71	49	69.0	22	31.0
	Controls	42	32	76.2	10	23.8

The vaccine was prepared by growing several strains of *B. abortus* (Bang) on glycerin agar in flasks, from 10 to 20 days. The growth was washed off in sterile saline, filled into amber bottles, and kept at refrigerator temperature until used.

During the period of vaccinations, nine different lots of vaccine were used. There were slight variations in the percentage of abortions for the different lots. Vaccine used within 24 hours after preparation seemed to be attended with a higher percentage of abortions following its use than that which had been stored in the refrigerator for several days. In some lots which were tested culturally, the organisms were found to be still alive after the vaccine had been stored at refrigerator temperature for five months.

Table V indicates in a general way the results obtained after the use of vaccine of different ages.

TABLE V—*Results obtained with vaccines of different ages*

AGE OF VACCINE	NUMBER OF ANIMALS TREATED	CALVED NORMALLY		ABORTED	
		NUMBER	%	NUMBER	%
24 hours	20	12	60.0	8	40.0
1 to 4 weeks	78	59	76.6	19	24.4
1 to 2 months	41	29	70.7	12	29.3
2 to 4 months	48	37	77.1	11	22.9
Total	187	137	73.3	50	26.7

BACTERIN

30 cows, ranging from two to seven months pregnant, were given bacterin or dead cultures of *Bacillus abortus* (Bang).
16 of the 30 (53.3%) aborted
10 of the 30 ranged from 2 to 4½ months pregnant
4 of the 10 (40%) aborted
20 of the 30 ranged from 4½ to 7 months pregnant
12 of the 20 (60%) aborted
23 of the 30 were blood-tested five months previous to the injection of the bacterin
9 of the 23 were negative
3 of the 9 (33⅓%) aborted
14 of the 23 were positive
9 of the 14 (64.3%) aborted.

There is no question that Bang abortion disease can be prevented and controlled, and undoubtedly will be entirely prevented in the future. Proper methods need more advertising. It took some of our most modern live stock owners almost thirty

years to understand that it is more profitable to maintain herds free from tuberculosis by the adoption of proper preventive and control measures than to maintain diseased herds. So will it take time, after proper methods for the prevention and control of bovine abortion are devised, for them to understand that it is more economical to keep herds free from this disease.

There are possibly those who contend that the Bang bacillus is of no more importance, as a cause of abortion in cattle, than numerous other so-called causes. The Bang bacillus has been identified as the specific cause of a specific condition in cattle which is frequently accompanied by the symptom commonly termed "abortion." It is not questioned that abortions occur as a result of other causes. The writer believes that, aside from certain exceptional and unusual conditions, a very high percentage of abortions in cattle is caused by *Bacillus abortus* (Bang). The elimination of this cause of abortion is directly resultant in an increased herd efficiency from the standpoints of abortion and sterility; the preservation of blood lines and the propagation of certain outstanding families; more milk or beef; and, therefore, a more lucrative business.

Veterinarians in general possibly do not realize the annual loss in milk alone to a dairy herd in which there are, for example, 20 per cent of abortions and 10 per cent of sterility, which means that 30 cows in one hundred have failed to give normal birth to offspring during the year. It can readily be perceived that the equivalent of the entire herd, in number of animals, is lost every three to four years.

The statements of a number of breeders who keep accurate records indicate that cows which abort will not produce, on an average, more than one-half the amount of milk produced when calves are carried to maturity. Practically the same is true of cows which fail to conceive for a period of one year. To keep milk production at its highest point, it is necessary for cows to freshen normally about once each twelve to fourteen months.

Assume that this is a pure-bred herd and located convenient to a good milk market, and the average appraisal value of this herd of 100 cows is $200 per cow. The herd would then have a value of $20,000.00. Consider the average milk production for normal cows in the herd at 6000 pounds, and worth five cents per pound. Each cow then should produce milk worth $300.00 annually. But thirty cows produce only 3000 pounds, or a milk value of $150.00 each, which equals $4500.00 for the thirty,

which a nount is also equal to the loss in milk value the herd must sustain annually on account of abortion and sterility. Assume that 50 per cent milk production is sufficient to maintain (feed and care for) the 30 cows and we still have a $4500.00 loss to which should be added the value of 30 calves. It can be readily seen then that value equivalent to the entire value of the herd is lost every four to five years. If the appraisal value is $100.00 per cow, or $10,000.00 for the herd, the value of the herd is lost every two years.

The total number of cattle in Pennsylvania is estimated at 1,500,000. Estimated number of dairy cattle is 860,000, of which 80,000 are pure-breds and 760,000 grades.

Assume that, of the total 860,000 dairy cattle, one-third, which seems a low estimate, of the herds are infected. Then there would be approximately 280,000 cattle in infected herds. If in these herds there is 25 per cent inefficiency due to abortion and its sequelae, there would be 70,000 cattle annually fail to reproduce.

Figured on the basis of a normal production of 5000 pounds of milk per cow, sold at three cents per pound, and a cost of $125.00 per cow for maintenance, each cow then should show a profit of $25.00 without considering a calf value, but since the total income per cow is $75.00, each cow shows an actual loss of $50.00, and a total loss of $75.00 The total loss then for 70,000 cows would be $5,250,000.00.

The loss in beef breeds and calf loss in dairy breeds would be somewhat more difficult to estimate.

If it is fair to estimate that each of the other forty-seven states shows one-half the loss Pennsylvania must sustain, then it is fair to estimate the loss in the United States at more than $100,000,000.00 annually.

That the symptom "abortion" does not always occur is no indication that a cow is not infected. Neither does the absence of the symptoms, "cough and emaciation," indicate that a cow is not infected with tuberculosis. But when a cow manifests symptoms of tuberculosis, steps are taken to determine, by the application of a tuberculin test, whether tuberculosis is the cause, or not.

Blood tests properly applied at proper intervals to determine if cows are infected with Bang abortion disease will accomplish results equally as valuable as tests for tuberculosis, provided reacting animals are disposed of in a manner similar to that in

which tuberculous animals are disposed of and much more strenuous and exacting measures are inaugurated against the introduction of animals from outside sources.

A positive reading to this test does not indicate that the reacting animal will abort or ever has aborted. Neither does a positive reaction to the tuberculin test indicate that the animal is showing at the time, or ever will show, the symptoms, "cough and emaciation." A positive reading to either test indicates infection with the specific cause of the disease in question, and that reacting animals are dangerous animals to keep in the herd—not dangerous to themselves, but dangerous to other animals. In either case, they may not be spreaders at the time they reacted, but there is no way to foretell when they will become spreaders.

Quite a number of herd owners in Pennsylvania are, in co-operation with the State Bureau of Animal Industry and the local practicing veterinarian, attempting to prevent and control bovine infectious abortion in their herds of cattle through the use of blood tests in conjunction with sanitary measures and herd divisions, with complete separation or disposal of reactors, both male and female. For such measures to benefit the herd owners requires considerable perseverance.

We have had the greatest amount of difficulty in those herds to which animals are added. In no case should animals be added to a herd until after they have passed two blood tests, applied at least at 60-day intervals. Pregnant animals should be added under no conditions. A pregnant animal should be kept isolated until after she has given birth to a normal calf and has passed a blood test, not within two weeks after having given birth to a normal calf. Where possible, it is advisable to keep heifers carrying their first calf out of the herd until they have given birth to a normal calf and have passed a blood test at least two weeks later. Cows or service bulls should not have access at any time to manure piles and stable drainage. All pregnant animals should be observed by the herdsman daily. All animals showing symptoms of abortion and normal time parturition should be removed from the herd and placed in a properly constructed maternity stable, which should be thoroughly disinfected or fumigated before permitting another cow to enter it. In case an abortion occurs in the stable or pasture, the cow should be immediately isolated; the place where the abortion occurred should be thoroughly disinfected; the fetus and mem-

branes should be carried in a sound container to a safe place and should be burned or buried. Improperly conducted maternity stalls become infection stalls.

Where infected and clean herds are established as a result of bood tests, the clean herd should be tested at rather frequent intervals and reactors removed, until finally no additional reactors are found. It is then advisable to blood-test two or three times each year, until sources of infection are eliminated.

Our results have not been good where we did not have proper cooperation of herd owners and herdsmen. Where we have had proper cooperation, the results have usually been good.

In many herds the percentage of reactors is so high to begin with that it would not be advisable to attempt separation of the mature cows, but clean herds can be established by applying the principles outlined to the young stock, which will eventually replace the mature herd.

First Herd

The first premise at which it was attempted to control abortion disease by the use of the blood test and removal of reactors, in conjunction with sanitary measures, maintained a herd which was established in 1912 from 12 original females as free from all transmissible diseases, so far as the then available methods would determine. This is Ardrossan herd, which has been under the management of Dr. E. C. Deubler for a number of years, and that the herd has been kept free from disease has been due largely to his keen observations and persistent efforts. Out of 301 births in this herd, only three abortions have been known to occur. Two of these cows were negative to a test for bovine abortion, and the other one was later removed from the herd as a reactor. There has been only one reactor in the herd since 1921. Out of approximately 130 births since 1921, there has not been a known abortion from any cause whatever. Heifers are bred to calve at about two and one-half years of age. There has been an average of 42 to 43 producing females in the herd for the last three years, and there has been an average of 43 calves born per year during the last three years. Since 1921, there have been only two sterile cows. Including service bulls, there are approximately 70 animals over one year of age in the herd. The last test, August 8, 1924, on 82 animals, showed all animals negative.

During the twelve years which the herd has been in existence,

there has been an average of 25 females of producing age. During that time, 301 calves were born, or an average of one calf per year for each cow in the herd. There has been about 2 per cent sterility, which has been overbalanced by the birth of a few sets of twins.

Second Herd

The next herd, in which we attempted control, consisted of between 90 and 100 mature animals. Abortions had been occurring rather frequently, and the owner had been selling all aborters to the butcher. The herd was tested in 1920 and nine reactors removed, one of which aborted three weeks later. A retest was made in 60 days and one more reactor removed. Not a single abortion occurred in the herd during the vear 1921, after which time the Bureau discontinued work in the herd. Measures are at present being carried out under the guidance of practicing veterinarians for the prevention of abortion in this herd.

Third Herd

The third herd is the well-known Oak Hill Estate of Friendship Guernseys. The Pennsylvania Bureau has conducted work in this herd through Dr. Freeman A. Marshall, who, in January, 1921, recommended separation of the herd in accordance with results of the blood tests.

Owner's Report (Third Herd)

A report prepared by the owner (Mr. A. A. Thompson) of this herd shows that the herd had been in existence since 1905. There had been no abortion troubles until 1919, when several cows aborted, and a diagnosis positive of bovine infectious abortion was established. The report shows that during the summer of 1920 several cows were added, and during the fall of 1920 several abortions occurred in the herd. A blood test was applied to the entire herd, and early in 1921 all reactors were separated, and clean and infected herds were established three-fourths mile apart.

Mr. Thompson's report shows that during the years 1922 and 1923 eight animals from the reacting herd were disposed of on account of sterility. In the non-reacting herd, no animals were slaughtered on account of sterility.

"*Reacting dams* will not breed from year to year. Only one animal in our reacting herd has calved three years in succession."

"*Non-reacting dams* will not abort; that is, our experience

seems to demonstrate that the bacillus of Bang is the chief cause of abortions."

"*Dead germ injections:* In 1921, of the 13 animals injected we had 4 live calves, or 30.7 per cent. Of the 10 animals not injected we had 7 live calves, or 70 per cent."

"*Live germ injections:* In 1922, out of 11 animals injected with live germs we had 4 live calves, or 36.3 per cent. Out of 14 animals not injected we had 6 live calves, or 43 per cent."

The report also shows the comparative cost of milk production in the two herds. The owner stated: "From a financial standpoint we find it does not pay to keep a reacting herd."

Comparative Costs August 1, 1921, to August 31, 1923

	Reacting Herd	*Clean Herd*
Average number of cows	24	18
Total milk production	64,447 qts.	94,458 qts.
Total cost	$8,943.54	$8,254.02
Per quart cost	.168	.104

Remarks

The above portions of the Thompson report of the third herd are given here to illustrate a breeder's attitude on abortion control, and, while some of the opinions expressed may not be the true condition in other herds, they are this owner's actual experiences and are worthy of attention.

The figures given on comparative cost of production in the two herds illustrate that the milk estimate above, for inefficient cows, is not too low. Not all cows in this reacting herd are inefficient, but when it is considered that 24 cows, over the period of time given, produced only 64,447 quarts of milk, or an average of 2685, and 18 cows produced 94,458, or an average of 5248 quarts, the fact is demonstrated that milk production of cows in the clean herd is nearly twice that in the reacting herd. If the 18 cows in the clean herd were brought up to 24, the total production should be 125,952 quarts, as compared with 64,447 quarts for 24 cows in the reacting herd.

Fourth Herd

The fourth herd consisted of 89 Shorthorn cattle of breeding age. To the first test, 53 per cent reacted. Immediately after this test, two herds were established a distance of about one-half mile apart. The clean herd was tested in 60 days, and one additional cow reacted. This cow had calved the day previous,

TABLE VI—*Reactors in herd 24*

DATES OF TESTS			1914 1915	5-26 21	Nov 1922	2-22 23	4-13 23	4-26 23	5-11 23	7-3 23	7-23 23	9-10 23	10-12 23	11-5 23	11-13 23	12-11 23	1-2 24	2-8 24	2-21 24	4-10 24	4-28 24	6-17 24	7-7 24	8-6 24	NORMAL CALVES AND ABORTIONS			REMARKS
Number tested....				41	101	127	2	94	17	96	10	97	11	134	56	97	13	94	7	126	9	81	6	103				
Number reactors...			5	7	22	25	2	11	12	32	1	26	3	15	4	2	4	1	2	0	2	0	0	0				
Additional reactors						6	2	5	0	2	1	2	1	3	2	1	0	1	1	0	1	0	0	0	BRED	CALVED OR ABORTED	DAYS	
No.		BORN																										
1	52	5-30-11	+		P1	P1				P1		P1		P1											2-3-22	9-6-22	215	
2	169	5-25-08	+	P1	P1	P1																			8-6-22	4-30-23	267	Living calf
3	189	3-13-12	+		P1	P1				P1		P1													12-6-22	8-4-23	241	
4	3	1-27-13	—	P1	P1	P1		P1	P1	P1		P1		P1												1915		Aborted
5	6	1-12-13	—	P1	P1	P1				P1		P1																
6	40	9- 8-13	—	HS	P	P				P1																		
7	195	1913	—	P1	P1			P1	P1	P1		P1		P1														
8	41	9- 6-14		P1	P	P1				P1																		
9	50	4-15-13	—		P	P				P1																		
10	13	6-18-16			P1	P1				P1		P1													3-31-22	10-13-22	196	
11	16	9-15-13			P1	P1				P1																1917		Premature
12	33	4- 8-13			P1	P1																						
13	70	8-19-19			P1	P1				P1		P1													6-30-23	3-9-24		Premature, lived
14	84	1- 9-14			P1																					1918		Abortion
15	86	11- 5-17			P	P1			P1	P1		P1		P1											9-2-22	4-1-23	211	
16	95	1-17-19			P1	P1			P1	P1		P1													1-1-22	9-12-22	254	
17	96	7-26-19			HS	P1				P1		P		HS														
18	107	12-10-19			P1	P1		P1	P1	P1		P1																
19	110	10- 3-18			P1	P1				P1															2-4-22	10-22-22	260	
20	141	9- 3-18			P1	P1				P1		P1		P1														
21	156	10-31-18			P1	P1																						
22	159	11-16-18			HS	P1		P1	P1	P1		P1																
23	31	3- 1-12	+	SS	N	HS		HS		HS	HS					HS	HS											
24	135	9-20-17			SS	P1																						

| | | |

and her calf also reacted. A test 90 days later revealed no additional reactors and no abortions had occurred in the clean herd, while either five or six had occurred in the reacting herd. This herd was then sold on account of death of its owner.

Further Remarks

The results obtained in the above herds indicated that we should not hesitate to recommend the method of sanitation, blood testing, and elimination of reactors, for prevention, control, and repression of Bang abortion disease. To carry the plan through successfully will require considerable perseverance. The nature of the disease is an indication that if breaks occur, much worse results can be expected than when breaks occur in tuberculosis repression.

Report on Herd 24

Herd 24 is a fair-sized herd, which maintains an average of approximately 100 animals of producing age, including four to five bulls, and a total of 175 to 200 animals of all ages. Blood tests were made in the herd in 1914 and 1915. A few animals that were in the herd and were positive then were positive in 1922. Two animals were positive in 1914, and were negative in 1922 and since. Several animals were negative in 1914 and 1922 and since. Forty-one animals were tested in May, 1921, and those which were positive at that time are shown in table VI.

Since work was begun in this herd in November, 1922, a total of 231 animals have been tested, and 50 reactors have been removed. Three of these were calves, two were virgin heifers, and one was a service bull. The reactors are indicated in table VI. Those animals which were positive in 1914 and negative in 1922 are not shown in the table.

Key to Table VI

N means negative.
SS means slightly suspicious. Not complete agglutination in a 1-to-20 dilution.
HS means highly suspicious. Complete agglutination in a 1-to-20 dilution.
P means positive. Complete agglutination in a 1-to-50 dilution.
P1 means complete agglutination in dilutions of 1 to 100, or higher.
Plus (+) or minus (—) under the column headed 1914-1915 means positive or negative at that time.
c means calf (normal, aborted or premature).
Blank spaces opposite individual animals under columns covering the later dates of tests indicate that these animals were no longer in herd 24.
The serial numbers, 1 to 50, in the first column, are used in this paper when referring to individual animals shown in the chart.
The numbers in the second column are the author's identification numbers and are not referred to in this article.
The third column shows the dates of birth.
The column headed, "Normal Calves and Abortions" shows all cows which aborted, and other cows which calved close to the date they first became positive to the blood test.

Discussion of Table VI

This table shows the results of tests for fifty reacting animals, forty-four of which were mature females. Since the fall of 1922, sixteen of these females have aborted or calved prematurely.

Cow 1 showed a high reaction to the agglutination test, but was negative to five complement-fixation tests applied at intervals, never becoming positive to this test. She aborted at 224 days, on September 6, 1922.

Cow 35 calved at 255 days, on November 11, 1922, and showed three negative tests after this date. She showed a positive reaction on April 26, 1923, and aborted at 162 days, on August 29, 1923.

Bull 37 was a service bull which, on February 22, 1923, was negative to the test. In May, 1923, his right scrotum became swollen, hot, and painful, and interfered considerably with locomotion. On July 3, 1923, he showed a positive reaction to the test, agglutinating at a dilution of 1 to 3300. He was slaughtered and the right testicle and spermatic cord were several times the size of the left. He showed an orchitis, periorchitis, and epididymitis. The tunica albuginea was pushed away from the testicle, and a pocket, formed between the two, contained 1½ pints of a thick, creamy, flaky pus. From this pus was isolated a pure culture of *Bacillus abortus* (Bang).

This bull had been used to serve the reacting cows, also received feed that was left in the mangers of test cows. He was stabled at a distance of approximately two hundred feet from the females.

Several cows, as can be observed by study of the table, aborted or gave birth to apparently normal calves soon after a negative test, and on a subsequent test were found positive.

The heading, "Additional Reactors," in the table does not indicate in every instance that the additional reactors had been previously tested. If no previous test is indicated in table VI, the reaction is on the first test for the particular animal.

Remarks (Herd 24)

After the November, 1922, test, the cattle in this herd were separated into two rows in the stable. One row contained reactors, and the other contained non-reactors. The cattle in the two rows faced each other across a space of about eight feet. In both rows the mangers were about three feet high. The stable drainage and manure disposal were good. The reactors and non-

reactors went into separate pastures, and there was no communication except what was possible under the above stable arrangement.

In addition to the stable arrangement of the cattle, all aborters went out of the herd until they were free from discharge. Later, all reacting animals in advanced pregnancy were removed from the herd and kept out until after calving.

On October 19, 1923, all reacting animals were transferred to another part of the farm, a distance of about three-fourths mile from the non-reactors.

On January 14, 1924, all reactors were removed from the farm, and after this date all additional reactors were removed immediately after showing a reaction.

Abortions in Negative Cows (Herd 24)

The cows reported below except No. 35 are not shown in table VI.

Cow 35 is discussed above.

Cow 24 (born 10-11-19) was slightly suspicious in November, 1922, and all tests since have been negative. She gave birth to a dead calf at 244 days, on 9-6-22 (2 months previous to first test), which seemed rather large for this stage of development. Cultures and guinea pig inoculations were negative.

Cow 19 (born 2-8-19) gave birth to a dead calf at 209 days, August 27, 1922 (three months previous to first test), calved normally in 1923, and has been sterile since.

Cow 76 (born 10-1-20) gave birth to an apparently premature living calf, August 2, 1924, which, according to dates of breeding, would have been carried 251 days. The calf was small, but the central incisors were through, and the calf has been very lively. The cow showed no discharge indicative of abortion. The placenta came away normally and appeared clean. Tests were made, August 6, 1924, and August 14, 1924, and showed both the cow and the calf negative.

Cow 79 (born 9-5-17) has not been even suspicious to any test.

Normal calf 2-5-20 (275 days)
Dead calf 1-23-21 (255 days)
Normal calf 1-31-22 (270 days)
Dead calf 11-24-22 (189 days—abortion)
Dead calf 11-15-23 (279 days)

Cow 132 (born 12-15-18) gave birth to a normal calf at 274

days, in September, 1921. She then gave birth to a living calf at 262 days, on 12-19-22.

Cow 196 (born 6-28-15) gave birth to dead twins at 265 days, on 11-28-23. The body cavities of both these twins were filled with blood. Cultures and guinea pig inoculations proved negative. This cow was hooked in the flank a few days before giving birth to these dead calves.

Developments in Herd 24 Since Last Test, August 6, 1924

A negative test of all mature animals left in the herd on June 17, 1924, and again on August 6, 1924, would indicate that the disease in this herd was quite well under control. All conditions, except a small calf, would indicate that cow 76, which gave birth to a premature calf, August 2, 1924, is negative. As shown under the heading, "Abortions in Negative Cows," both this cow and her calf were negative, August 6, 1924, and again, August 14. A retest, on this date, of two animals very slightly suspicious on August 6, showed these two animals again slightly suspicious.

On August 7 and 8, 1924, the manager of this herd was somewhat surprised that two heifers gave birth to well-developed normal calves, at what his breeding dates would indicate three and six weeks premature. Reference to the service record indicates that both of these heifers had had earlier service. Both were negative to a test, August 14, 1924.

On August 14, 1924, a cow seven months pregnant showed the characteristic symptoms of abortion. This cow aborted on August 15, and showed the characteristic placentitis and discharge. A study of cultures is being made, and guinea pig inoculations have been carried out. This animal was positive in a 1-to-50 dilution, August 15, 1924. She had been slightly suspicious on tests made, June 17 and July 7, 1924, but was negative on the test August 6. This again demonstrated that infected pregnant animals will not all react before aborting or calving normally, but will react soon after.

Concluding Remarks

The results obtained in herd 24 indicate that the suppression of abortion by elimination of reactors is a slow but worth-while process. One cannot be sure that the disease is eradicated until results of blood tests have been negative for a period of possibly one year. All cows in the herd should have given birth to calves and should have passed the blood test subsequent to calving,

that is, the entire herd should have been negative over sufficient period to give all cows in the herd time to calve. After such period, the herd might be considered free. Pregnant cows, even though sufficiently infected to cause abortion, will not all react unless they are such pregnant cows as reacted previous to pregnancy. This is demonstrated by the results indicated in table VI. The percentage of those that do not react may be comparatively small, but nevertheless there are a few. This should impress the recommendation made above, "Do not add pregnant animals to clean herds under any conditions." In other words, "Do not place absolute dependence on a negative test in pregnant animals unless the history is known with surety."

Throughout our work, the percentage of abortions in negative animals kept separate has been small when compared to that of positive animals. In herd 24 there were comparatively few true abortions—possibly only one—from November, 1922, to August, 1924, among animals which were negative. A number of animals, however, aborted or calved prematurely and were positive on subsequent tests. A number also calved apparently normal and were positive on subsequent tests.

Several animals were slightly suspicious on one or more tests and later were negative. Four slightly suspicious animals shown in table VI became highly suspicious or positive on a retest two or three weeks later. Slightly suspicious animals which became negative are not included in the table.

The distinctions "slightly suspicious" and "highly suspicious" are made because animals in this herd, which once became highly suspicious, were later positive, except one animal which remained highly suspicious.

Just why a number of cows will not react a short time before calving or aborting has not been satisfactorily explained. If it is true that the mouth is the chief channel of infection, it seems that the above condition should not exist. Bang bacilli which enter the mouth, in passing out with the feces, are afforded an opportunity to come in contact with the lips of the vulva. It seems possible that while infection first entered the body of the animal by way of the alimentary tract, it is secondly afforded opportunity to enter the genital tract.

There is no direct communication between maternal and fetal circulations. There need be no direct communication between maternal circulation and other uterine contents.

At the time of aborting or calving, the uterus undergoes a

change, blood spaces are ruptured, and there becomes communication between the maternal blood and the uterine contents. This may explain the fact that some cows will react after and not before calving.

During more than four years, in which the writer has devoted considerable of his time to a special study of sterility and abortion in cattle, his views of the proper method for the suppression of Bang abortion disease have not changed. This is indicated by the several articles which have been published.

The Pennsylvania Plan for the Prevention and Repression of Bovine Infectious Abortion, adopted by our State Bureau in December, 1921, needs few modifications today. Its principles were practiced for considerable time before its adoption. This plan was published in the 1922 Proceedings of the U. S. Live Stock Sanitary Association. The writer can make no better recommendation for properly conducting a campaign against Bang abortion disease than the adoption of the principles of this plan.

Discussion

Dr. E. A. Watson: I gathered from the paper which was read that the solution of the abortion problem lies in the elimination of the reactors. It depends upon how we are going to eliminate them, it seems to me. I infer that the legitimate way in which we can get rid of the reactors is either by establishing separate herds or by sending the reacting animals to the slaughter-house. We know perfectly well that it is possible to establish a clean herd, free from abortion, by eliminating the aborters and reactors. This was done by M'Fadyean and others. But is that a practical way for the breeder to overcome the wide spread of abortion throughout Canada and the United States? It seems to me that it is not practicable; and the elimination of reacting animals by slaughter would tend to paralyze the cattle breeding industries of this continent.

I would like to be in a position to advise the owner how to control abortion successfully, but it does not seem enough to tell him that we have to eliminate the reacting animals. He has a heavy enough burden with the tuberculosis reactors—almost more than he can continue to support—and this heavy sacrifice of animal life is destroying, to some extent, some of the finest breeding strains. If we are to add to that the elimination of abortion reactors by slaughter methods, I fear it would alienate the cooperation of breeders and prove absolutely impossible of putting into effect. I still believe that the solution lies in immunization. The present methods of immunization are still comparatively crude.

There are many ways of immunizing, and we should not lose sight of the possibility of a more efficient method of immunization than we have at present. I would like Dr. Barnes, if he will, to explain further how it is practical to eliminate reactors from herds in which the disease is widely prevalent. I know that we have some of the finest herds in the country—most valuable herds—in which sixty or seventy-five per cent are reactors, and I do not see how it is practicable to eliminate those reactors to build up healthy herds without too heavy a sacrifice.

Dr. D. B. Palmer: I would like to ask Dr. Barnes about the necessity for the elimination of the reactors which he speaks of. I have a herd under my control which was tested by the serological method two years ago; fifty per cent were classified as positive reactors and fifty per cent were classified as negative. There has never been an abortion or retained after-birth on the

farm in the last two years. Each and every one of the mature animals has given birth to a living calf once during the two years; some are still pregnant: Why the necessity, in this particular herd, of eliminating the reactors? Apparently no damage is being done because they are reactors.

DR. FITCH: Unfortunately I did not hear the first part of Dr. Barnes' paper. I would like to ask him what standard he uses in the agglutination test; what a suspicious animal is and what a negative animal is, and whether there are any animals, in his experience, which react to one test and fail to react to the other, and how he would classify them?

DR. BARNES: In reply to Dr. Watson's question regarding the elimination of reactors, my paper did not altogether recommend the elimination of reactors in every herd. I made the statement that in some herds the percentage of reactors is so high that it would not pay to eliminate the reactors, but free herds can be established by applying the principles outlined, in the young stock, which will eventually replace the mature herd. I believe that if you have a herd in which a bunch react, you can build up another herd around it, on the outside. If you have reactors you can put them in the reacting herd.

Dr. Palmer's question is answered in a table which I did not show you. In this report I stated that three animals reacted in 1914 and again reacted in 1922. There were no abortions in this herd between 1918 and 1922, but in September, 1922, one of these old reacting cows aborted, and in October another cow in the herd aborted.

When we started to test the herd in November, 1922 we tested 101 animals and found only twenty-two reactors, and the next time that we tested we got six additional reactors, and the number kept going up for about a year until we separated the herd. There were at the time of the November, 1922, test, two animals in the herd that were positive in 1914 and aborted in 1922 and '23. The first animal in the herd to abort was one of these 1914 reactors and we believed was the origin of the 1922 outbreak. If you keep reacting animals in the herd, Dr. Palmer, you are likely to have a similar experience.

There was another animal that was positive in 1914 and aborted in August, 1923, at 241 days. The first animal that aborted in the herd was 215 days pregnant. After that time several animals aborted, until, during the period from November, 1922, up to the present time, there have been seventeen abortions. I reported sixteen in the paper, but one occurred just the day before I left for this meeting. There were no reactors between April and August, 1924.

Dr. Fitch asked what we classify as suspicious, highly suspicious and positive. We do not classify our positive animals on the same scale as that used by Dr. Theobald Smith, Dr. Schroeder and others. Slight agglutination in a one-to-twenty dilution is read slightly suspicious; complete agglutination in a one-to-twenty dilution is read highly suspicious. Complete agglutination in a 1-50 dilution is read positive. Every animal in this herd, that we called highly suspicious, with one exception, has gone to positive in a dilution of 1-100 or higher. One cow in the herd showed a good reaction to the agglutination test applied five times at intervals of approximately two months and at no time showed a reaction to the complement-fixation test. This cow aborted. In this particular herd every cow that reached to the complement-fixation test also reacted to the agglutination. We are now using only the agglutination test as our routine test. Failure of the one animal to react to the complement-fixation test may have been a matter of technic in that we used only two dilutions.

If animals show a reading suspicious to the agglutination test we advise a retest after two weeks. Slightly suspicious animals on retest very often show a negative reading. A few become positive.

Apache and Navajo counties, Arizona, has been placed under provisional quarantine for scabies by Dr. S. E. Douglas, state veterinarian.

SOME PROBLEMS FOR THE VETERINARIAN[1]

By VERANUS A. MOORE, *Ithaca, N. Y.*

N. Y. State Veterinary College at Cornell University

It was the interest I have in the service rendered by veterinarians and my optimism in the future development of the veterinary profession that prompted me to accept the kind invitation of Dr. Ferneyhough to be with you on this occasion. It is pleasant always to meet with men who are interested in the real problems of their profession. It is the troublesome questions that are presenting themselves, and ultimately their satisfactory answers, that assure us that progress is being made.

We have come from distant places, in many of which professional subjects of a perplexing nature exist and difficult decisions are to be made. Most of these are local and must be adjusted by those who are familiar with the details, and who alone are concerned. The subjects in which we are all interested pertain to the veterinary profession as a unit—an integral part in the composite of useful human activities. A profession like this, developed to relieve physical suffering and to protect animal husbandry from the losses due to disease, necessarily encounters difficulties that become real problems as the work advances. It is well from time to time to reflect, not only on the progress that is being made, but also the adjustments that may be necessary to keep the work in harmony with the purpose of our calling.

At present there is a tendency among many veterinarians toward pessimism—that destroyer of good morale—and a feeling that the valuable economic service and the important sanitary work that has been, and is being, done by them, are somehow no longer appreciated or wanted. This tends to a spirit of dejection which finds expression in many declarations of discouragement. It seemed fitting at this time to inquire into the reasons for this attitude and ascertain if possible to what extent, if at all, the members of the profession are responsible for it.

Veterinarians are, from the very nature of their work, servants of animal owners and of the public. They are affected by the same influences that modify the prosperity of the live stock industry. Again, they can serve directly only when called upon to do so, and they have no authority to execute their professional

[1]Presented at the ninth annual meeting of the Southeastern States Veterinary Medical Association, Richmond, Va., November 10-11, 1924.

commands. However, experience has shown that the influence of veterinarians possessed with honesty of purpose, technical knowledge, wisdom in its application, and sympathy with the human element, is often much more effective than the authority of legal statutes. When practitioners possessed of these attributes appear before animal owners, questions of authority do not arise. It is the directing of action by influence, rather than vested power, that distinguishes them as professional men.

The relation a profession holds to truth, its respect for facts, its adherence to ethical conduct, and the abiding faith of its members in honest service determine very largely its place, usefulness and power in the world. It is well, then, that individual members of a profession should be on the right side of the facts. This means that there are certain standards by which professional conduct may be judged. The truth—honest service—is not affected by what men think about it. In meeting difficulties, therefore, "we must abide by the stern, yet kindly, standard that is set against our judgments, and if you and I fail to meet the standard, it does not hurt the standard, but it does hurt us." There is much to encourage in those lines which run:

"It fortifies my soul to know
That though I perish truth is so,
That howsoe'er I stray or range
Whate'er I do, truth does not change.
I steadier step when I recall
That though I slip, truth does not fall."

While we rejoice in the accomplishments of the profession, it is well to remember that the evolution of scientific and technical veterinary medicine in America has been a long-time process. It was thought for a brief period, after our present educational requirements were attained, that we had preparation adequate to meet the demands. Almost immediately after the goal, toward which we had labored so long, was reached, the profession was hurled into a readjustment period of a manifold nature. This was initiated by the changes that have been going on for many years in the mode of transportation, eliminating largely horses from the cities, thereby shifting a large part of the veterinarian's work to food-producing animals in the country. This necessitated many and far-reaching changes not only in the profession itself but also in the source for its recruits. The World War did much to disturb practice. Fully twenty per cent of the

veterinarians in America entered the service, which in itself was sufficient to cause much confusion. A sojourn in military life often unsettles men for the responsibilities and routine of a private, professional career. The effect of the armistice on the live stock industry—the rapid reduction in prices of animals and their products—discouraged the owners. As a result they did not employ veterinarians when it seemed possible to get along otherwise. Added to this, there were issued regulations for certain disease control which required that the professional work should be not only supervised, but actually done, by federal and state employes. In some localities this overture to state veterinary medicine affected seriously many practitioners. It was in this maze of uncertainty that the profession suddenly found itself.

A Potentially Dangerous Situation

The combination of these unexpected events and procedures brought to the immediate attention of many veterinarians important questions relative to the *status quo* of the profession of their choice. The most significant and far-reaching effect has been the engendering of deep-seated discouragement in large numbers of individuals. There are those who see in the situation only disaster. They feel that the profession will revert back to lower standards of education and ideals of service. Their discontent is reflected in the steady reduction in the number of students in our veterinary colleges. They have fallen from over 2400 in 1914 to 523 in 1924. This means that, in the United States, there will be graduated annually about 100 veterinarians for the next four years. This situation causes many to imagine the development of a large number of "quacks" and charlatans to take over the treatment of animal diseases in this country. The horror of the suffering and torture of dumb creation and the vast economic losses that would follow such a procedure, rise before them as direful enemies of efficiency and future progress.*

While there has been no time in the history of veterinary medicine in America when there was a like, or even an approximate, succession of events which seems so to threaten veterinary

*In the April number of the *North American Veterinarian* Dr. Merillat called attention to a report of an army officer in Poland who went to Russia to ascertain the condition of her live stock. He found that one of the great causes for the starvation of millions of people, following the Revolution that broke out in 1917, was due to glanders in the horses, rinderpest in the cattle and other scourges that devastated the herds of sheep and swine. After the revolutionists had replaced the qualified veterinarians with laymen, selected largely from the "red army," Russia starved because she allowed her source of food supply to be destroyed through the instrumentality of animal diseases.

medicine as those which have been recorded in the last few years, there was never before a war that affected so many human and material interests as the one that closed in 1918. The physical law—that reaction is equal to action in an opposite direction—teaches us that we should expect more disturbance resulting from it than has been experienced in the past. The same factors that have affected veterinary practice have brought anxiety, if not depression, to other professions and vocations in the rural districts. The unsatisfactory economic conditions in agriculture have had a direct bearing on practitioners. But have veterinarians endured greater hardships or sacrificed more during these years than the people whom they serve? Have not the economic conditions that caused the depression in this profession dealt a more disastrous blow to the breeders, the stockmen and the dairymen than they have to their professional advisers?

We Must Adjust Ourselves

The rapid succession of events affecting animal husbandry and veterinarians seems to signify that the changes are taking place faster than the profession is advancing to meet them. The supposed contributing causes of the present condition have appeared to us within a very few years. But the future historian appraising these times may consider the factors mentioned as symptoms—episodes—in the struggle of ideas and economic forces that began long before the World War and lasted long after its close. However, it seems logical to believe that the cause for the present unrest is not due to lack of appreciation of veterinary service so much as to our inability to adjust ourselves quickly to the new order of things that sooner or later either will eliminate the profession or place it on a higher, more ethical and useful basis. I have faith to believe the latter alternative will prevail.

If we pass from the veterinarians themselves to the fields in which they perform their daily tasks, a cursory examination will show the great need for their services. We find little change in the number of animals in the country and a high mortality from disease. Reports of new and heretofore undescribed maladies are not infrequent. The diseases of poultry are becoming more and more destructive, and veterinary service is needed to prevent or control them. The owners of small animals are demanding from year to year more time and skill from practitioners. Horses are reported to be increasing in numbers, and

health authorities in many cities are awakening to their responsibility relative to more thorough meat and dairy inspection. Further, veterinarians are needed constantly to prevent, eradicate or keep under subjection the great plagues of dumb creation that otherwise threaten our animal husbandry. As the animals are here and the problems of protecting them against disease are with us and the number of veterinarians is decreasing rapidly, why should there be anything but optimism in the profession? It is clear that the work exists, and, for the conservation of animal life, economy and better sanitary conditions, it should be done. The crux of the situation seems to be that in the rapidity with which new procedures have been advancing, many of the contacts between practitioners, animal owners and live stock sanitary officials have been broken and that there are many loose, "live wires" that should be connected with the service needed by live stock owners to prevent the enormous toll taken by both sporadic and communicable diseases.

How Can We Make Ourselves More Useful?

The problems for the veterinarian are to be found in the adjustment of professional service to the new conditions. It was Lowell, I believe, who said that "new conditions demanded new schools." The changes mentioned have brought about new and trying conditions, affecting both stockmen and practitioners. The question of paramount importance is to determine how the relation between these can be made mutually beneficial in those cases where now it is unsatisfactory. What additional preparation is necessary on the part of the profession to enable more of its members to meet the demands of their clients and to make us all more useful?

The first question, then, has to do with the equipment of men for the work. If you will follow the development of veterinary education in this country from the time of the first schools, with no prerequisites, a course of but a few months in duration and teachers who made their living in general practice, to the present colleges with their prerequisites, four-year curricula and full-time teachers, all of whom are specialists, it would appear that the technical preparation is well provided for. The changes that transferred the major part of veterinary practice from equines in the cities to farm animals in the country were more rapid than the adjustments in the preparation. This finds many men striving diligently to treat food-producing species with a basic knowl-

edge of equines only. The education adequate to meet the needs of practitioners is, because of the complexity of their duties, difficult to determine. The entire setting is changing. The automobile enables them to make many times more calls than they could formerly, with the horse and buggy. Their territory is extended and their work more diversified.

As veterinary practice is essentially economic in its purpose, owners cannot pay the practitioner for too long a journey. This means that to provide efficient service veterinarians must be properly distributed. It may be necessary to subsidize them, as in Sweden, in the more sparcely inhabited districts. Again, veterinarians cannot be specialists to any great extent except, perhaps, in large cities. There is opportunity for a few experts, but their clientele must be scattered and within the territory of other men. The preparation, therefore, requires them to be able not only to diagnose and treat the diseases of all species of animals in their community, but to advise the owners in preventive measures as well.

Practitioners Require Broad Training

The sciences on which veterinary medicine depends were developed largely outside of the profession, but in recent years they have come to be a part of the individual's equipment. Thus the etiology of the infectious diseases was mere speculation until Pasteur pointed to microorganisms as their cause. Bacteriology, therefore, has come to be an integral part of the curriculum. Because of the truths it reveals, relative to the nature of disease, it must be included. The same is true of chemistry, botany and other pure sciences. Thus practitioners must have a wide, scientific knowledge to understand the symptom-complex of disease and its control. The practical question is, how far into these sciences we should require a student to go and what are the subjects that can be left for him to acquire by himself after graduation?

The Committee on Intelligence and Education of the American Veterinary Medical Association is insisting, and rightly so, that further progress should be made. Does this mean more intensive training in the highly technical topics and more information in pure science, or more adaptability and facility to apply that which can be acquired in our present courses? We who are connected with the colleges are anxious to know what to do next. You are in the field, and know the weaknesses of the present preparation.

It is to you that we appeal for help to make the curriculum better, the teaching more efficient and the graduate more useful. This seems to be an important problem to be solved by veterinary teachers and practitioners together. It is a mistake to think that teachers do not need the counsel of practitioners. A further valuable service that men in the field can render their profession is to encourage the right kind of young men to enter it. Good raw material is necessary to insure quality in the finished product, whether it be machines or professional men.

Our Professional Responsibility

A second problem, as I see it, deals with a broader and far more subtle aspect of the subject, namely, the professional responsibility of the individual. Pope said: "The proper study of mankind is man." The greatest problem in the veterinary profession today seems to be the veterinarians themselves—their qualifications for their work and their attitude regarding their obligations to the public as licensed and privileged persons. They sometimes disregard the position of honor and responsibility they hold in the state. It is not unreasonable to expect that always, but especially in times of depression or distress, veterinarians should be a support of no uncertain strength to their clients and community. Their training should have given them a broad outlook on life. In all matters pertaining to the diseases of live stock and their control they should be of inestimable value, but with the proper attitude toward their profession they will become to their clients far more than technical advisers. This is an individual matter. Professional efficiency is an active process. Every man, to render the greatest service, must not only fit himself for his work but adjust himself to the circumstances whatever they may be. A Scotch baker, who had become very wealthy, was asked, "How did you create so vast a fortune baking bread?" He replied, "I tried to make the best bread in all the Kingdom and the money made itself." The great problem is to qualify both technically and as good citizens. The true worth of professional men is not measured by their income, but by the sterling quality of their services.

A third factor of great significance is hearty cooperation with the state and federal government, as well as the owners, in the control of infectious and communicable diseases. This cooperation determines largely the efficiency of the live stock sanitary officials and the standing of the practitioners. The local veteri-

narians are usually the first persons, qualified to make a diagnosis, who see the infected animals. If the proper confidence exists they will be called as soon as there is indication of trouble. It is the practitioner, therefore, who often can check the further spread of a disease by the proper care of the first infected animals. An error or delay at this critical time may result in the beginning of a serious epizootic. The diagnosis, the isolation, the reporting to officials, and the precautionary instructions to the owners are all in the hands of the man who is called first. In these circumstances the privilege and the obligation to apply the principles of preventive medicine are with the practitioner only. The serious losses that have resulted from the failure of veterinarians to observe these principles are well known. Their indifference to the legal and moral obligations attached to their work, or neglect to carry out instructions or to report fully and promptly, as required by law, has encouraged officials to transfer sanitary and control work, that might be done by practitioners, to regular employes who can be held for obeying instructions.

Practitioners First Line of Defense

On the other hand, you all know of threatening outbreaks that were prevented and herds that were saved because practitioners did the right thing at the proper time. You also know veterinarians who, because of strict adherence to their professional duties and their interest in, and obligations to, their clients and the state, are not found wanting when weighed in the balance of private or public service. Such practitioners are great teachers in all matters pertaining to live stock sanitation and disease, for they establish the points of contact between the owners and the research institutions where new knowledge of great technical value is being acquired. Veterinarians often overlook this function which, for the advancement both of themselves and their communities, is of much importance.

The veterinary profession is undergoing evolutionary changes of great moment. Its colleges are no longer schools to prepare men to diagnose and treat the ills of individual animals alone, but institutions where instruction in hygiene and sanitation, dairy and meat inspection and the relation of animal diseases to public health are given consideration. The veterinarian is ceasing to be merely a "tinker" of sick animals and becoming a constructive leader in animal husbandry. His advice is constantly needed to solve the problems in animal breeding and

feeding to the end that diseases may be less frequent. As Panisset, of Alfort, France, states, "The veterinarian is more than the occasional adviser of the breeder; he ought to become the counsellor whose advice is most sought and most heeded."

The problems for the veterinarians, therefore, do not differ in principle from those of other professional men. They have to do with their preparation educationally, industrially and socially to meet the demands of the new conditions under which we are living. Better educated clients and definite knowledge concerning most diseases of animals that was unthought of a generation ago, have come upon us like a torrent of change that has been pushing life forward since the World War began. We who have been caught up in its onrush have been carried along too swiftly to be aware of the distance we have travelled. It has been said that "the last few years have done more than the previous hundred centuries to solve the problems of first importance in human progress—an understanding of the nature of disease and its control." The teachings of the great men in biological and veterinary sciences, so recently ridiculed, are coming to fruition. Let me conclude with a passage relative to a natural phenomenon that illustrates the tendency to retard progress and finally the acceptance of the new ideas.

"When the first little wave of the rising tide comes creeping up the shore the sun derides her, and the dry sand drinks her, and her frightened sisters pull her backward, and yet again she escapes; and still her expostulating sisters cling to her skirts, and the rabble of waves behind cry out against her boldness, and all the depths of the ocean seem rising to drag her down. And now the second rank of waves, who would have died of shame at being the first, have unwillingly passed the earlier mark of the little wave that led them; and now you may float in your ship, for lo! the tide is full. So it is with all systems of reform; though the pioneers be derided, the great needs of humanity behind push on to triumphant acquisition of the new order of things."

Fido First

Friend (rushing in to break the news): "Susan, dear, your husband and little Fido were in an accident."

Wife: "Good heavens! Have they been able to get in touch with a veterinarian yet?"—*Pelican.*

THE CALIFORNIA AND TEXAS FOOT-AND-MOUTH DISEASE OUTBREAKS[1]

By J. R. MOHLER

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After entire freedom from foot-and-mouth disease since the outbreak of 1914, this country during the present year has experienced two invasions of this foreign animal plague, the first one in California, the second one in Texas.

THE CALIFORNIA OUTBREAK

The first intimation the Bureau had that the disease might exist in California was a telegram received on February 20 from Dr. Rudolph Snyder, in charge of its field work in that State. Following a series of inoculation tests the disease was officially confirmed on February 23 and on that date a large force of employes, practically all of whom had had experience in previous outbreaks, was directed by wire to report immediately at Oakland, California. The employes selected for this assignment were those who, under the plan that the Bureau had worked out several years ago, were to occupy key positions.

On this same day an order issued by the Secretary of Agriculture placed under quarantine the counties of Alameda, Contra Costa and Solano. State live stock sanitary officials, especially west of the Mississippi River, and officers in charge of animal disease work in foreign countries, were advised by wire of this outbreak. Bureau inspectors in charge of field work in the western states were also notified by wire that the disease existed in California and were directed to be on guard. On February 25 the Federal quarantine was extended to cover the counties of Napa, Marin, Sonoma, San Mateo, Santa Clara and San Joaquin.

The disease was first observed in two dairy herds, one near Oakland, the other at West Berkeley. Headquarters were established at Oakland. Hon. G. H. Hecke, State Director of Agriculture, and Dr. J. P. Iverson, Chief of the State Division of Animal Industry, directed the State forces engaged on the work. Dr. Rudolph Snyder was placed in charge of the Federal force. On April 24, at the request of Governor Friend W. Richardson and Director George H. Hecke, of California, the

[1]Read before the ninth annual meeting of the Southeastern States Veterinary Medical Association, Richmond, Va., Nov. 10-11, 1924.

Federal Department of Agriculture took full charge of the campaign to eradicate foot-and-mouth disease. Headquarters were established at Sacramento with Dr. U. G. Houck, of the Federal Bureau of Animal Industry, in charge of both State and Federal forces.

The policy of promptly slaughtering infected herds, cleaning and disinfecting infected premises, and remunerating owners for animals and property destroyed had proved so successful in previous outbreaks that it was adopted in the handling of this one without a moment's hesitation.

The work of organizing the forces to suppress the outbreak was quickly accomplished. The first diseased herd was buried on February 28 and on March 22 the disease had been virtually eradicated in the Oakland area, to which it had been confined up to that time. On that date, however, infection was discovered in a large herd of range cattle in Merced County which is one of the important stock raising sections of the State. The situation confronting the State and Federal forces thus over night became more alarming than at any time since the disease was first discovered in California. Another draft of Bureau employes was ordered to this locality and the State forces were increased. The situation was further complicated by the spread of the disease within a few days to a large number of herds in that county and to nearby herds in the counties of Madera, Mariposa, and Stanislaus. These counties, comprising what was known as the Merced area, were placed under quarantine on March 24.

The infection was carried to the Los Angeles stock yards from Merced County in a lot of cattle forwarded three days before it was known that infection existed in that county. On March 24 an affected animal was found as it was being unloaded into the yards of a slaughtering establishment at San Francisco. This animal was one of a lot shipped from Merced County. Los Angeles and San Francisco counties were placed under quarantine on March 25. On March 27 the disease was found near Stockton, San Joaquin County. The infection in this instance was also traceable to a shipment from Merced County. San Joaquin County, however, had been under quarantine since February 25. The disease was stamped out in that county with but little difficulty and there was no spread of the infection at San Francisco. In Los Angeles County, however, the disease was spread to the holding pens of numerous slaughtering establishments, to large feed lots and to dairies in their vicinity. The situation in

that county was very serious and one of the most valuable Holstein herds in the country, in spite of every precaution that could be taken to prevent infection, contracted the disease. Efforts were made in this area to salvage a large number of cattle which were located in close proximity to infected premises. About 4,000 of these animals were slaughtered and passed for food, after receiving careful inspection. The salvaging of these animals saved the State and Federal governments approximately a quarter of a million dollars.

Other counties in which outbreaks occurred were Kern on April 2, San Bernardino on April 21, Orange on May 2, Tulare on May 17, Tuolumne on May 9, and Fresno on May 12. A total of 16 counties became infected out of the 58 in California. In all of these except Tuolumne the outbreaks were limited and were stamped out quickly without involving any great number of animals.

In Tuolumne county the situation from the beginning was very serious. The diseased herds were ranging in a mountainous and inaccessible country and in spite of every measure that could be taken, deer on two ranges in the Stanislaus National Forest contracted the disease. This necessitated a war of extermination against deer on these two ranges.

Eradication work in California was carried on under greater difficulties than had been encountered in any of the previous outbreaks in this country. Among these difficulties may be mentioned the spread of the disease to large herds of cattle and flocks of sheep in a rough, inaccessible and poorly fenced country suffering from the worst drought experienced in 30 years, inability to secure adequate trenching apparatus quickly, and the delay in excavating on account of the character of the soil, which in many sections was underlaid with hardpan and rock. In spite of these obstacles the campaign was waged with such energy and skill that control of the disease in all infected areas was definitely established before the end of July. Since then new infection has been found only in Los Angeles and Tuolumne counties. In the former, the last diseased herd was disposed of on August 23; in the latter on October 9.

The animals on their return to their home ranches from the Stanlislaus National Forest were kept under close observation while on the trail and are still being inspected at regular intervals.

The source of the outbreak in California has not been definitely determined. There is strong evidence, however, that the

infection was introduced in garbage or other refuse from a vessel from the Orient which docked at the Mare Island Navy Yard. The first appearance of the disease was in hogs near Vallejo, which were being fed on garbage obtained from that yard.

Embargoes against agricultural products imposed by many of the states caused tremendous losses, not only to the agricultural interests of California, but to many other interests both within and without the State, without, in our opinion, affording any increased protection to the live stock interests of the states concerned. It is very probable that the losses suffered as a result of these drastic and, in some instances, unnecessary embargoes were greater than those due to the enforcement of carefully considered Federal and State regulations promulgated with the single purpose of effecting eradication of this disease.

The Texas Outbreak

The outbreak of foot-and-mouth disease in Texas was officially confirmed on September 27, 1924. Reports reaching the Bureau on September 26, however, were so indicative of the disease that a force of employes experienced in foot-and-mouth disease eradication work was directed by wire on that date to proceed to Houston, Texas, and a Department order quarantining the counties of Harris and Galveston, and those portions of Fort Bend and Brazoria east of the Brazos River, was issued.

The infection first manifested itself in a herd of zebu cattle south of Houston. Hon. J. E. Boog-Scott, chairman of the Texas Live Stock Sanitary Commission, and Dr. L. G. Cloud, state veterinarian, immediately proceeded to that point and assumed charge of a considerable force of State employes. Dr. Marion Imes was placed in charge of the Bureau employes. At the request of Governor Pat M. Neff, of Texas, the Department, on October 1, assumed full charge of the eradication work in that State, the combined forces being placed under the direction of Dr. Imes.

This outbreak was promptly suppressed within 30 days, only 9 herds contracting the disease. No new infection has been found since October 27.

A thorough investigation is being made to determine, if possible, the source of the infection in this instance. So far it has been impossible to determine definitely the channel through which the infection gained entrance into this country. No

connection has been established, however, between this outbreak and the one in California.

Conditions in both of these states are considered very good at this time. It will be necessary, however, to continue a force of men in the field for the next two or three months and, as a precautionary measure, the Stanislaus National Forest will not be opened for grazing next year.

Ten Lessons from the Recent Outbreaks

1. *Accurate diagnosis.* The importance of carefully examining animals exhibiting suspicious symptoms and continuing such examination until it is definitely determined whether or not the affection is foot-and-mouth disease cannot be stressed too strongly. The failure of a local veterinarian in the central part of California to recognize the disease in a herd of range cattle which he was called to examine, although a number of the animals were very lame, resulted in a tragedy to the live stock and business interests of the southern part of the State. His snap diagnosis of gravel lameness in this instance, which permitted exposed cattle to be shipped to the stock yards at Los Angeles, San Francisco and Stockton, caused a loss in the Los Angeles area alone of approximately 12,000 cattle and 8,000 hogs, including one of the most valuable Holstein herds in the whole United States, without taking into account more than 7,000 cattle in a half-finished condition which were slaughtered and salvaged to prevent their contracting the disease.

2. *Prompt notification by telegraph or telephone.* Every moment's delay in notifying the state or government of a suspicious case, especially in any new outbreak of foot-and-mouth disease, is an unnecessary hazard and may cost our citizens millions of dollars. In one case a telephone message to a stock yard would have headed off a consignment of exposed cattle which could readily have been diverted and salvaged by slaughter. Instead, a letter was written, which was not received until after the cattle had been unloaded and had infected the yards. In another case a letter was written which contained such important information that a telegram or even a radiogram would have been justified. The failure to adopt the speediest form of communication permitted one owner to cut out and throw on the open range 51 stray cattle found on his ranch just 18 hours before his herd was found infected. These 51 stray cattle will cost Texas $100,000 as every contact animal on the open range

in that vicinity immediately became a potential spreader of this disease and had to be slaughtered. Furthermore, this not only extended suspicious territory, but will serve to prolong the period of costly quarantines and embargoes.

3. *Frequent and thorough inspections.* By making such inspections of all herds in the vicinity of infected premises the disease was discovered in its incipiency and the propagation of the virus and its spread to other herds was reduced to a minimum.

4. *Early slaughter and burial of diseased herds.* That this is essential if the infection is to be combated effectively was clearly shown by the fact that in those instances where there was unavoidable delay in disposing of herds of cattle on account of the large number of animals involved, inability to secure trenching apparatus quickly, and delay in excavating on account of hardpan and rock, there was frequently considerable spread of the infection to nearby herds, whereas, in those instances where the organization was such that diseased herds were buried within 12 to 36 hours after the infection made its appearance in the animals, there was little, if any, spread of the disease to other premises.

5. *Optimism necessary.* In an atmosphere where owners are losing their means of earning their daily bread, where children are seeing their pet lambs and calves shot down and buried in quick lime, and hired help are forced to look elsewhere for jobs, it ill becomes any official of foot-and-mouth disease work to show the slightest sign of pessimism. Yet in all our outbreaks we have met men who from the sidelines have loudly exclaimed that eradication was impossible, that we were spending the money to no possible advantage, that the fight was lost before we had scarecely begun, that flies, bumble bees, baby chicks, etc., were important factors which we were ignoring, that infected deer would carry the infection to the Mississippi River, that slaughter and disinfection were unscientific but on the other hand saltpetre and sulphur or some other clap-trap would at once stop the disease like it had in the self-styled discoverer's home country, which, as proved frequently the case, was a country like Germany or Italy, where all such concoctions had failed to prevent the infection from becoming firmly and permanently implanted. All leaders, in foot-and-mouth eradication particularly, should be optimistic, for they are the generals fighting a hidden foe and they must keep up the morale of their assistants. While their hours are long and their labors arduous, these

leaders, as a rule, are not exposed to the shot and shell, the whims and tirades of the owners and the owners' friends, nor to the strange food, improvised beds and climatic changes of the men in the trenches.

6. *Veterinarians should be used only along professional lines.* As has just been stated, in the early days of the California outbreak, veterinarians were used unduly in the trenches. Veterinarians shot down the cattle, sheep and hogs in the trenches. Then they went into the trenches and slashed the hides and opened the abdominal cavities to permit a leveling of the surface and early decomposition. Later expert marksmen shot the animals and laborers did the slashing and cutting of the carcasses. This permitted the veterinarians to perform professional services in diagnosing and differentiating diseases, in surveying adjacent territory, tracing rumors, addressing meetings, answering inquiries and performing other duties of a related character. Of course emergency cases will occur when a veterinarian will have to do some shooting and slashing, but in order to conserve the services of the expert, this should be the exception and not the rule.

7. *Slaughter method the most effective and economical with our present knowledge of the disease.* Losses under this method, including indemnities, operating, and all other expenses, have not been so great in suppressing the outbreaks in this country during the past 40 years as they would be in one year if the disease became established here and was fought by continental European quarantine and treatment methods.

8. *Quarantine of infected premises must be stringent.* All avenues through which infection might escape should be completely closed. No movement of live stock or commodities should be permitted from such premises. Dogs, cats, poultry, pigeons, etc., must be confined or killed. Guards should be properly placed in order to enforce all quarantine measures strictly.

9. *State quarantines often too drastic and not based on experience with or scientific knowledge of the disease.* Such embargoes caused tremendous losses not only to the agricultural and commercial interests of California, but also to these interests in all parts of the country.

10. *Organization of forces.* Consolidation of State and Federal forces under unified control avoided duplication of work and conflict in eradication methods.

THE EFFECT OF COD LIVER OIL ON DOGS CONVALESCING FROM DISTEMPER[1]

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It has long been a recognized fact that all the essential dietary factors, including the vitamins, must be present if normal growth and metabolism take place. The lack of any one of the vitamins may produce, in addition to the derangements brought about in the systemic cycle, definite deficiency diseases such as neuritis, scorbutis, rachitis and xerophthalmia. This latter condition is found in animals on a diet deficient in the fat-soluble A vitamin, the syndrome of which, in rats, as described by Emmett,[1] simulates very closely the conditions found in the eyes of dogs in the later stages of distemper.

It is recognized by some that the lack of vitamin A causes a marked decrease in the body resistance of an animal, so that it is more easily a prey to infections, especially those of the respiratory tract. However, when the fat-soluble A is supplied to the animals showing the syndrome produced by the deficient diet, they usually return to normal rapidly, the rapidity depending on the extent to which the changes have taken place.

Cod liver oil, which we now know contains a large amount of vitamin A, was recommended by Winslow[2] as being indicated in conditions of malnutrition occurring primarily; in the course of chronic diseases; or following acute diseases. It is especially indicated in diseases of the respiratory tract, where it improves the nutrition of the mucous membranes as well as the general nutrition. He states also that it is one of the best remedies in tardy convalescence from canine distemper.

With the symptoms produced in rats, by the lack of this vitamin A, in mind, and the subsequent alleviation when it was supplied, cod liver oil was administered to a dog suffering from deranged metabolism following an attack of acute distemper. The results were so gratifying that further experiments were undertaken to determine what effect the oil would have upon convalescence in this disease.

[1]Read before the Southeastern Michigan Veterinary Medical Association, Detroit, Mich., October 15, 1924.

The dogs used in this experiment were all obtained from the city dog pound and practically all were in the advanced stages of the disease, i. e., showed evidence of secondary infection at the time they were brought to the laboratory. Owing to the source of these animals no history as to the probable source or time of infection could be obtained.

As far as possible the dogs were grouped in pairs so that the weight, symptoms, etc., might be as near alike as possible. One dog of each group received daily administrations of one ounce of high-grade cod liver oil for each ten pounds of body weight. No other treatment was given. The control dogs received no treatment whatsoever but were observed in the same manner as the treated dogs. The diet for all the dogs used throughout the experiment was that used in maintaining our normal dogs kept for experimental purposes. Observations of symptoms and temperature readings were made daily while the weights were recorded twice weekly.

Clinical Observations

Group I. Symptoms:—Both dogs, cough; muco-purulent discharge from eyes and nose; appetites, fair; temperatures, approximately 101° F.

After six days of treatment the treated dog showed an entire cessation of symptoms and was apparently normal except as to weight. The daily administration of the oil was continued until the thirtieth day, when the animal was released, having shown an increase of 4.5 pounds over the initial weight.

The discharges from the eyes and nose of the control dog continued until the ninth day and coughing continued until the thirtieth day, when it was released, having shown a gain of 3 pounds over the initial weight.

The temperatures of both animals showed but slight variation during the 30 days of observation.

Group II. Both dogs were in practically the same condition as those in group I. The treated dog of this group showed a cessation of all symptoms on the eighth day, but on the twenty-first day developed pneumonia which proved fatal eight days later. This may have been due partly to the fact that it was very difficult to administer the oil to this animal, a part of it having been inhaled, producing foreign-body pneumonia.

At the end of 30 days the control dog still coughed and showed a muco-purulent discharge from both nostrils.

Group III. Symptoms as in groups I and II. After twelve days of treatment the treated dog had entirely recovered except as to weight, which returned to the original on the twenty-sixth day, when the animal was released. The control died from broncho-pneumonia on the twenty-first day, having shown a gradual decline from the beginning of the observation.

Group IV. Symptoms as in previous groups. The treated dog died from broncho-pneumonia on the seventh day, while the control died from the same cause one day earlier.

Group V. Symptoms:—Both dogs showed cough, muco-purulent ocular and nasal discharges, the temperatures being practically normal. After receiving the cod liver oil for ten days the treated dog had recovered, except for a slight sneezing, which ceased ten days later. When released at the end of thirty days there was an increase of one pound over the original weight.

The control gradually became worse, developing a marked keratitis on the tenth day, which cleared up slightly before death from broncho-pneumonia on the twenty-third day.

As it seemed from the results obtained at this stage of the experiment that the administration of the cod liver oil had a very beneficial effect and shortened the period of convalescence, it was decided to determine, if possible, the effect of the cod liver oil on the bacterial flora of the respiratory tract.

In order to make cultures from the bronchi of these living dogs, an operation described in a previous paper[3] was perfected. This consisted of passing a swab through a canula inserted between the tracheal rings, the animal being under complete anesthesia at the time. Cultures also were made from the secretions of the eyes and nose at the same time.

Group VI. Included in this group were three animals, two of which were treated, the remaining one being left untreated as a control.

Dog 1. Symptoms:—Temp., 101° F.; cough; watery discharges from both eyes; both nostrils sealed by dried discharges. Bacteriological findings:—Bronchi, *B. bronchisepticus;* eyes, staphylococci and streptococci; left nostril, staphylococci and a few streptococci; right nostril, staphylococci only.

This animal was practically recovered after two weeks' treatment but developed pneumonia one week later, succumbing to the effects of this condition two weeks later. This was due partly, at least, to the oil gaining entrance into the lungs as in the treated dog of group II. Nothing positive could be determined

from cultures made postmortem, as the autopsy was not made for several hours after death, the animal having died during the night.

Dog 2. Symptoms:—Temp., 102° F.; cough; very slight, watery ocular discharge; muco-purulent nasal discharge. Bacteriological findings:—Bronchi, *B. bronchisepticus;* both eyes, streptococci; right nostril, staphylococci; left nostril, staphylococci and *B. bronchisepticus.* This dog improved rapidly on the treatment, there being no symptoms present at the end of ten days, except a slight cough, which gradually subsided until the twenty-first day, when there was only a slight sneezing present. At this time cultures were made from the bronchi, yielding *B. bronchisepticus.* Three weeks later this organism was again recovered from the bronchi. Three weeks after this, cultures from the bronchi were negative.

Dog 3 (Control). Symptoms:—Temp. 102° F.; sneezing; no ocular discharge but a slight watery nasal discharge. Bacteriological findings:—Bronchi, *B. bronchisepticus;* both eyes sterile; left nostril, staphylococci; right nostril, staphylococci and *B. bronchisepticus.* At the end of the tenth day there was a cessation of the watery nasal discharge although the animal continued sneezing until the thirtieth day. On the twenty-first day *B. bronchisepticus* was again recovered from the bronchi and again three weeks later. Three weeks after the last recovery of the organism the bronchi were found to be sterile.

Group VII. Symptoms:—The treated dog showed a cough, normal temperature, copious muco-purulent discharge from both eyes and both nostrils, bacteriological examination of which showed only staphylococci to be present. Staphylococci and *B. bronchisepticus* were recovered from the bronchi. After eighteen days' treatment with the cod liver oil the animal was normal, except for a slight watery discharge from the eyes. Cultures from the bronchi at this time were negative.

The control dog showed a temperature of 102° F. and had watery discharges from the eyes and nose, cultures from which showed them to contain staphylococci only. Sneezing was very marked. Cultures from the bronchi were negative.

Within a few days the nasal and ocular discharges became muco-purulent, the sneezing being superceded by coughing. After eighteen days' observation there was little, if any, improvement in the animal's condition, cultures from the bronchi at this time showing the presence of *B. bronchisepticus.*

Group VIII. The treated dog showed a cough, normal tem-

perature, muco-purulent nasal and ocular discharges and chorea. Bacteriological findings:—Nasal and ocular discharges, staphylococci only; bronchi, staphylococci and *B. bronchisepticus*. After eighteen days' treatment there was only an occasional discharge from one or the other nostril, with none from the eyes. Cultures from the bronchi were negative. The chorea was somewhat improved.

The control showed a slight cough, chorea and slight muco-purulent nasal and ocular discharges which contained staphylococci only. Cultures from the bronchi were negative. After eighteen days there was no improvement in the animal's condition. *B. bronchisepticus*, staphylococci and streptococci were recovered from the bronchi at this time.

Group IX. Symptoms:—The treated dog showed a cough, normal temperature and muco-purulent discharges from the eyes and nose. Bacteriological findings:—Both eyes, staphylococci; both nostrils, staphylococci and diplococci; bronchi, staphylococci. At the end of three weeks, when the animal was practically recovered, staphylococci were again recovered from the bronchi.

The control showed practically the same symptoms except that the temperature stood at 103° F. Bacteriological findings:—Discharges from eyes and nose, staphylococci only; bronchi, *B. bronchisepticus* in pure culture. After one week of observation this animal succumbed. No postmortem examination was made.

Discussion

The temperature of none of the animals at any time was above 103° F. or below 100° F. except in the later stages of the fatal cases, when they were found to be subnormal, as was to be expected.

In the treated animals, there was, in all instances, a decline in weight until recovery began to take place, after which there was a gradual increase. The same condition obtained in the untreated dogs which recovered. In the fatal cases there was a gradual decline from the beginning of the observations.

After six to twenty-one days of treatment the animals receiving the relatively large doses of the high-grade cod liver oil showed a cessation of symptoms, except in a few instances, where a slight cough remained. In two instances the animals had apparently recovered, but later developed pneumonia which proved fatal, due in part, at least, to inhalation of the oil.

The controls had either succumbed to the disease or had shown no improvement at the time the treated animal of that group was released.

B. bronchisepticus was recovered from the nasal discharges of but two of the nine dogs subjected to bacteriological examination. The organism was recovered on first culture from the bronchi of six of the dogs, two being negative and one showing staphylococci only to be present. The two dogs whose bronchi failed to show *B. bronchisepticus* on first culture, later were found to harbor the organism. The apparent sterility of these passages at the time of making the first cultures may have been due to faulty technic.

It is of interest to note that two of the dogs, although apparently recovered, continued to harbor the *B. bronchisepticus* for at least three weeks after recovery.

Summary

1. The results obtained from the administration of relatively large doses of high-grade cod liver oil to dogs suffering from distemper indicate that, while it is not specific, it is of great benefit in shortening the period of convalescence, and can be recommended as a valuable adjunct to the treatment of this disease.

2. *B. bronchisepticus* was isolated from the bronchi of eight of the nine dogs from which cultures were made.

3. *B. bronchisepticus* was isolated from the nasal discharges in but two of these nine cases.

4. Two of these dogs were found to harbor *B. bronchisepticus* for at least three weeks after apparent recovery had taken place. These animals should be regarded as being carriers of the organism and possible spreaders of the disease.

References

[1]Emmett: Thera. Gaz., Nov. & Dec. 1921; Jan. 1922.
[2]Winslow: Vet. Med. & Thera., 6th ed. 1908, p. 658; 8th ed. 1919, p. 461.
[3]Schlingman: Vet. Rec. (Lond.) 1924, iv (35), p. 745.

A Jolt for the Doctor

Doctor: "Did you tell that young man of yours what I thought of him?"

Daughter: "Yes, Papa, and he said that you were wrong in your diagnosis, as usual."—*Boston Transcript.*

SOME VETERINARY REMINISCENCES

VIII. Going To Cuba

By N. S. MAYO, *Chicago, Ill.*

In 1904, while attending the A. V. M. A. meeting at St. Louis and visiting the Louisiana Purchase Exposition, I received a message that the Cuban Government would pay my expenses to Habana, with a view to taking a position as veterinarian to the new Cuban Agricultural Experiment Station that was being organized and officered largely by Americans. I found that this position had been offered to Dr. C. A. Cary, who visited Cuba and declined the offer, but in spite of this I decided to look the situation over and went from St. Louis via Mobile to Habana.

I shall never forget this first trip to Cuba. The gulf was smooth and the water blue as sapphire, with occasional schools of porpoises or flying fish. After two and a half days of delightful sailing, the shadowy headland of Mariel could be seen and a few hours later we steamed into the beautiful harbor of Habana. On our left were the high, massive, grey walls of Moro Castle, from which a dozen ancient cannon (called by the natives "The Twelve Apostles") looked grimly down. On the right lay the city of Habana with its houses tinted pink, blue or yellow, reminding one of a Christmas toy village. The wreck of the Maine reared its twisted and rusted superstructure above the water of the bay and a tattered wreath of flowers was tied to the mast.

On passing the quarantine and customs, I was met by an old college friend and was driven to Santiago de las Vegas, a town about twelve miles south of Habana and the site of the Agricultural Station. The road from Habana was of fine macadam and had been built by Cuban prisoners in the Ten Years War (1868-78). It was shaded by great, flat-topped trees that interlaced their branches over the road. Everything was new and strange to me—the country with the tall, white-boled royal palms "standing like upturned dusters brushing at the sky above 'em." The people, language and customs, all were different, and I felt as if I had been transported to another world. The only familiar sight was the pair of American mules that drew our carriage at a fast pace, and it was a pleasure to see one of

these mules on our last trip to Cuba, fifteen years later, still on duty.

The Cuban Agricultural Station occupied a large, one-story structure that, in the time of Spain, had been a "Cuartel" or military barracks. It was built in quadrangular form, enclosing a "patio." The walls were of concrete about three feet thick and there was a large cistern in the patio to furnish water in case the troops were shut in. There were several Americans and their families at the station. They had a Chinese cook and a general mess in one part of the main building. The scene as we joined them for supper still stands out vividly. An immense, barn-like room with heavy timbers above, a long table lighted by a few flickering candles, some native, bare-footed black boys waiting on the table and hundreds of bats darting about.

I spent about a week in Cuba, taking a trip down the island to Camaguey to the cattle-growing region and having most interesting and satisfactory interviews with President Palma and the Secretary of Agriculture, who had the delightful faculty of making you feel that you were absolutdly essential to the welfare of the Agricultural Station. I was completely carried away by the novelty of the situation, so I made them a proposition that was accepted, cabled my wife to begin packing up and thus began our great adventure and one that we have never regretted.

TAKE YOUR KODAK TO PORTLAND

Dr. E. E. Chase, chairman of the Local Committee on Arrangements, at Portland, is planning some scenic trips for the members of the A. V. M. A. who come to Portland for the meeting in July. Dr. Chase advises every member in the United States to bring a kodak, as the scenery on the trips which are planned will be beautiful, and the members will be able to obtain many pictures which they will prize very highly. Dr. Chase says that one will never forgive himself if he neglects to do this.

Dr. Chase suggests that our Canadian brothers bring theirs also, and if Dr. Mayo is in the market for antiques, he will find all kinds of them in Portland. Dr. Chase adds that he will gladly appoint someone to assist Dr. Mayo in securing any kind of antiques he may have in mind. Dr. Chase hopes to meet some of his army comrades at the meeting, and any members of Company 45, Batallion 12, who were at Camp Greenleaf, Ga., between August 5, 1918, and November 10, 1918, who attend the meeting, are requested to get in touch with him.

CLINICAL AND CASE REPORT

(Practitioners and others are invited to contribute to this department reports of unusual and interesting cases which may be helpful to others in the profession.)

DIABETES IN A PIG SHOWING PANCREATIC LESIONS[1]

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During the course of investigations in swine diseases in this laboratory there occurred a case of glycosuria as a probable result of an infectious disease.

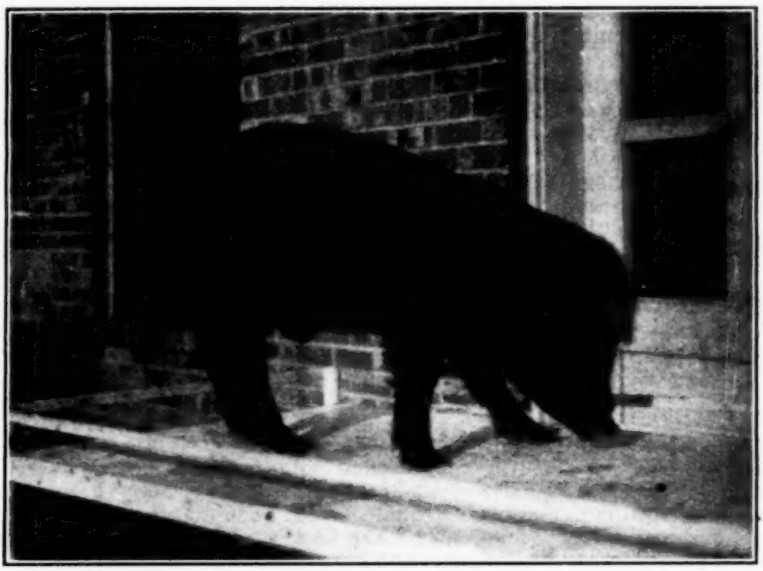

FIG. 1. Glycosuria subject about 4 weeks prior to death.

A dearth of available, specific data exists in the literature of veterinary medicine pertaining to diabetes in swine and its significance, while the literature in the human field contains a large volume of data dealing with this condition during and following various infections. In view of these facts it is believed that a record of this case might prove of interest and stimulate further observations by others.

History: Duroc pig, male, about 25 pounds, under size for spring pig. Received, Nov. 4, 1922. Spring pigs were in only

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fair state of nutrition, passing segments of intestinal casts, described as being of a yellow color and necrotic in character.

Nov. 29, 1922

Blood:

Red cells	7,200,000
White cells	20,400
Hemoglobin (Tallqvist)	90%
Differential count:	
Polymorphonuclears	58.5
Mononuclears	8.0
Transitionals	1.5
Lymphocytes	30.5
Basophiles	.5
Eosinophiles	1.0

Urine:

Specific gravity	1017
Reaction	Acid
Indican	Positive; reaction not strong
Sugar	Strongly positive—heavy precipitate
Albumin	Negative
Bile	Negative

All sugar tests were made by both Purdy's and Benedict's modification. Quantitative sugar tests were not begun until December 6, after we had obtained positive qualitative reactions on three preceding days.

Dec. 1, 1922.

Fecal examination:

Parasites	None
Occult blood	Positive

Dec. 4, 1922.

Urine:

Specific gravity	1024
Reaction	Acid
Indican	Negative
Sugar	Positive

Feces:

Occult blood	Slow, medium reaction.
Parasites	Several ascaris eggs.

Dec. 5, 1922: Pig fed in morning and immediately thereafter placed in urine cage. Feed consisted of ground corn and oats slop. Subject received no more feed until next morning. Urine collected noon and evening of Dec. 5, 1922, and morning of Dec. 6, 1922. The first sample of urine gave a strong reaction to sugar, the second contained less sugar, while the third contained a still smaller quantity.

Dec. 6, 1922: After morning feed of corn (1½ ears) and water, a composite of urine collected until evening showed by quantitative test 3% sugar.

Dec. 7, 1922, 5 p. m. to Dec. 8, 1922, 8 a. m.

Urine:

Reaction	Acid
Volume	180 cc
Odor	Typical
Color	Dark straw
Albumin	Negative
Indican	Negative
Sugar	0.625%
Occult blood	Suspicious
Bile	Negative
Specific gravity	1025

Dec. 8, 1922: During the past two weeks subject was observed rubbing sides vigorously against cage wall almost incessantly. The hair coat over sides was long and somewhat kinked or waved and of normal thickness. The skin

presented a dry appearance with slight desquamation and piled up in some areas. Clinically the case did not possess the appearance of mange. Repeated scrapings from sides and ears, centrifuged in sodium hydroxide, were negative for mange mites. No lice could be found on the subject.

CORN AND WATER RATION

Dec. 9, 1922.

Urine:

Color	Dark straw
Specific gravity	1034
Reaction	Acid
Albumin	Negative
Sugar	6.66%
Indican	Negative
Occult blood	Suspicious
Bile	Negative

The feces were of a bright yellow color, composed of considerable corn hull and cellulose, with a few spots on surface tinged with bright, red, fresh blood. These red surface spots reacted to the guaiac-benzidin test. The interiors of fecal masses were negative for blood. No parasites nor eggs noted.

CORN AND WATER RATION

Dec. 10, 1922, 9 a. m. to 6 p. m.

Urine:

Odor	Typical
Specific gravity	1032
Reaction	Acid
Albumin	Negative
Sugar	0.5%
Bile	Faint
Indican	Negative

CORN AND WATER RATION

Dec. 11, 1922 to Dec. 12, 1922.

Urine:

Volume	75 cc
Color	Dark straw
Odor	Typical
Specific gravity	1025
Albumin	Negative
Reaction	Acid
Bile	Negative
Indican	Negative
Occult blood	Negative
Sugar	0.5%

CORN AND WATER RATION

URINE

Composite Sample	*% Sugar*	*Specific Gravity*
Dec. 12 to Dec. 13	0.5	1025
Dec. 14 to Dec. 15	0.25	1018
Dec. 18 to Dec. 19	4.5	1033
Dec. 20 to Dec. 21	1.6	1034

BRAN AND TANKAGE RATION

URINE

Composite Sample	*Specific Gravity*	*% Sugar*	*Albumin*
Dec. 21 to Dec. 22	1007	Negative	Negative
Dec. 26 to Dec. 27	1034	4.5	
Dec. 27 to Dec. 28	1024	0.4	Negative
Dec. 28 to Dec. 29	1020	0.82	Negative
Jan. 1 to Jan. 2		0.34	

SUMMARY OF SUGAR FINDINGS

Glycosuria subject: No quantitative tests run until Dec. 17, 1922.

Dec. 1, 1922	Very heavy precipitate
Dec. 4, 1922	Positive
Dec. 5, 1922	First sample—strongly positive
Dec. 5, 1922	Second sample—less pronounced

CORN AND WATER ONLY

Date	*% Sugar*
Dec. 6, 1922	3.0
Dec. 8, 1922	0.625
Dec. 9, 1922	6.66
Dec. 10, 1922	0.5
Dec. 12, 1922	0.5
Dec. 13, 1922	5.0
Dec. 15, 1922	0.25
Dec. 19, 1922	4.5
Dec. 21, 1922	1.6

BRAN AND TANKAGE ONLY

Date	*% Sugar*
Dec. 22, 1922	Negative
Dec. 27, 1922	4.5
Dec. 28, 1922	0.4
Dec. 29, 1922	0.82
Jan. 2, 1922	0.34

A normal control subject weighing 32 pounds was placed on both carbohydrate and protein feeds. The urine was always negative to sugar on numerous trials.

A review of the literature failed to reveal any data on the sugar tolerance of swine. In order to have some comparative figures for our results in the glycosuria subject, an apparently normal pig was fed varying quantities of commercial dextrose, and the urine collected over a period of 24 to 30 hours, and the percentage and total quantity of sugar determined.

Table I shows the results of feeding definite amounts of commercial dextrose to the glycosuria and normal subjects. Where the same amount of sugar was fed, it will be noted that about ten times as much was recovered from the glycosuria subject as from the normal.

TABLE I—*Sugar (commercial dextrose) feeding to determine tolerance*

GLYCOSURIA SUBJECT: WEIGHT, 22 LBS.

SAMPLE	VOLUME (CC)	%	SUGAR RECOVERED (GMS.)
20 gms. dextrose fed			
1	40	2.312	1.1
2	30	2.286	0.8
3	50	0.50	0.25
4	210	0.272	0.50
5	55	0.280	0.14
			Total 2.79

15 gms. dextrose fed			
1	100	1.82	1.82
2	35	0.31	0.12
3	40	0.08	0.08
			Total 2.02
10 gms. dextrose fed			
1	120	0.8	0.98
2	80	0.2	0.16
3	155	Neg.	0.00
			Total 1.14
NORMAL CONTROL PIG: WEIGHT, 32 LBS.			
44 gms. dextrose fed			
1, 2, 3 — 24 hrs.	150 120 70	0.132 0.06 0.09	0.198 0.072 0.063
			Total 0.333
35 gms. dextrose fed			
1, 2, 3 — 24 hrs.	130 50 25	0.28 0.20 0.09	0.364 0.100 0.022
			Total 0.486
25 gms. dextrose fed			
1, 2 — 24 hrs.*	40 60	0.5 Neg.	0.20 0.00
			Total 0.20
25 gms. dextrose fed			
1, 2, 3, 4 — 24 hrs.	30 60 80 120	0.10 0.11 0.08 Neg.	0.03 0.066 0.064 0.000
			Total 0.160
15 gms. dextrose fed			
1, 2, 3 — 24 hrs.	120 70 80	0.148 0.000 0.04	0.177 0.000 0.064
			Total 0.1834

*Symptoms of anorexia developed, apparently as a result of exclusive concentrated protein feed. Subject was placed on normal ration and rested, after which the 25 grams dextrose feeding was repeated.

On January 19, 1923, the glycosuria subject developed anorexia, and on the following morning was found comatose. Slight improvement was noted until noon, when it became weaker and died at 5 p. m.

Autopsy Findings

Rigor mortis beginning to appear in anterior parts of carcass. The hair coat on sides was very long, curled and kinked. Head and neck were short and stubby, this appearance being made more prominent by edema in this region. Abdomen greatly distended. Visible mucous membranes showed slight cyanosis. Natural openings were clean. Widespread subcutaneous edema.

Precrural lymph glands: Markedly swollen and juicy, with perilymphatic tissue and surrounding regions gelatinous. *Microscopic appearance:* Edema most pronounced in capsule and surrounding tissue with some capillary injection. Individual cells separated in some areas, considerable edematous fluid having been lost during fixation and dehydration.

Thyroid: About the size of a small walnut, very dark red, intermingled with some glue-like areas on cut surface. *Microscopic appearance:* Marked passive congestion, acini slightly distended in most instances, epithelium stretched, cells being very broad and low.

Heart: Friable and collapsed. Endocardium and valves presented no changes.

Spleen: Organ contracted, edges thin; grayish-brown colored surface having the appearance of an atrophied organ. Cut surface flat, follicles not visible, pulp not increased. *Microscopic appearance:* Slight interstitial productive splenitis with follicular atrophy.

Eyes: Normal, cornea transparent.

Skin: Dry and scaly surface. *Microscopic appearance:* Sebaceous and sudoriferous glands smaller than normal.

Lungs: Slight edema.

Kidneys: Capsule stripped with ease. Cut surface bulged showing alternating red and gray lines in cortex. *Microscopic appearance:* Renal cells swollen and granular and passive congestion.

Bladder: Distended with grayish-white mucous exudate on surface.

Stomach: Wall thickened and mucosa dark red with heavy coat of mucus. *Microscopic appearance:* Acute catarrhal gastritis, complete desquamation of surface epithelium and marked congestion; many blood vessels exposed.

Small intestines: Wall swollen, with catarrhal exudate on surface, marked desquamation and congestion. *Microscopic appearance:* Diffuse cellular enteritis, numerous eosinophiles throughout, especially in follicles. Epithelial cells laden with mucin granules. Desquamation advanced in some areas.

Large intestine: Distended with hard fecal masses. Mucosa slightly reddened and swollen.

Liver: Dark red, edges rounded, blood flowed freely from cut surface, very friable. *Microscopic appearance:* Marked passive congestion. Some leucocytic infiltration, and focal areas of fatty degeneration (fig. 2).

Adrenals: Slightly reddened and friable. *Microscopic appearance:* Passive congestion, with few fat globules in cells of zona fasciculata.

Pancreas: Dark pink in color throughout. Injected vessels not prominent. Edges rounded a trifle. *Microscopic appearance:* Intertubular cell masses (islands of Langerhans) appearance of being atrophied and degenerated. The island cells consisted of many closely placed nuclei with a few fragments of cytoplasm while others were hardly recognizable except for the presence of a few remnants of such areas. The balance of organ showed congestion with few lymphocytes and leucocytes scattered throughout.

Discussion

A slight diversity of opinion still exists regarding the etiological relationship between diabetes and infectious diseases. Some observations would seem to admit that there is a definite relationship. Galippe maintained that bucco-pharyngeal infections and the absorption of pus from chronic gingivitis may be the cause of certain diabetes. A curable acute diabetes following mumps complicated by pancreatitis is reported by Debre and Labbé. Similar cases have been recorded by other observers. Achard and Leoper report a pneumonia case developing spontaneous diabetes during the progression of the pulmonary process, the glycosuria disappear-

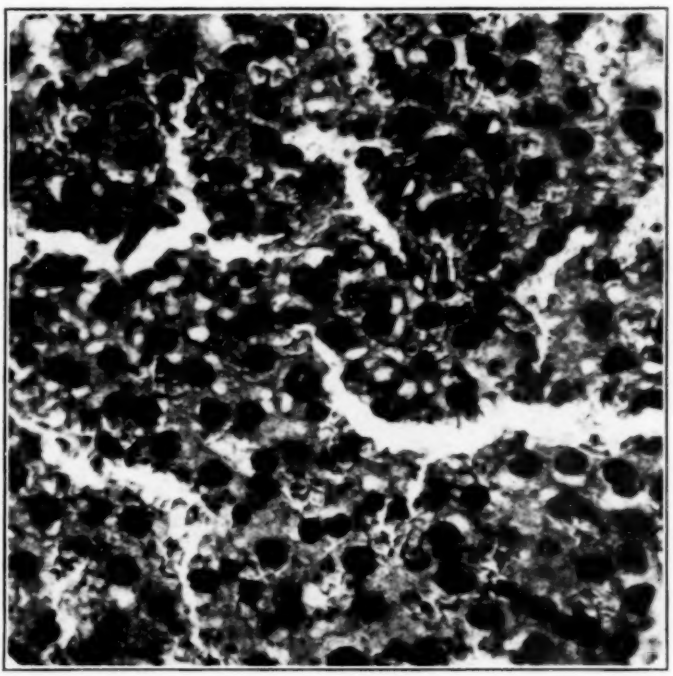

Fig. 2. Liver of glycosuria subject showing marked congestion and some fatty degeneration. Hematoxylin and eosin.

ing during convalescence to reappear several months later accompanied by polyuria and polydypsia. Diabetes following carbuncle has been noted by various observers. Another significant case is that of a diabetes subject possessing only a mild glycosuria which became very serious following influenza and in spite of a severe diet maintained this character.

Whipple found focal necrosis in the pancreas of 41 of 230 cases

examined. These findings were confined chiefly to lobar pneumonia or other acute bacterial infections.

With our present knowledge it is impossible to state definitely how infections act in the production of diabetes. Diabetes is attributed by various authorities to being of pancreatic, hepatic or nervous origin or to an influence acting upon the glyco-regulator apparatus. An infection may act upon any one or all of these factors.

Pancreatic Form of Diabetes

The role played by the pancreas in the metabolism of sugar and its relation to diabetes is an important one. A consideration

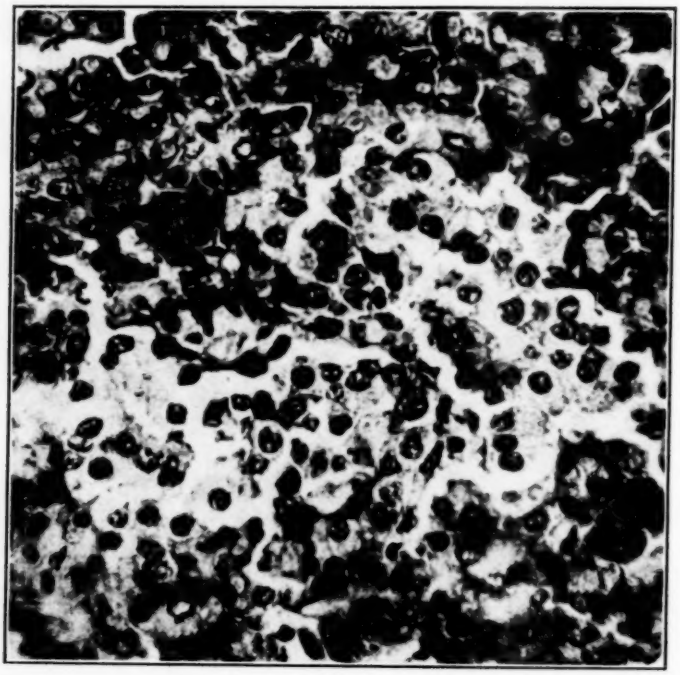

Fig. 3. Pancreas x 480. Control pig showing normal intertubular cell mass. Hematoxylin and eosin.

of certain experimental data bears this out, the most widely known being those of Mering and Minkowiski, wherein they extirpated the pancreas resulting in fatal diabetes unless a remnant was left. Although it is sometimes pointed out that a number of diabetes cases show no morphological alterations of the intertubular cell masses, this, of course, does not preclude the existence of a physiological or chemical alteration in the cells or enzymes of this organ.

Cohnheim has shown that muscles possess the power of destroying sugar, but muscle extract has slight or no glycolytic action. Although pancreatic extracts possess no glycolytic activity whatever, a mixture of muscle and pancreatic extracts does have the power to cleave sugar to a point where it is no longer recognizable by its reducing agents.

Charrin infected the pancreatic duct of nine dogs, one presenting a glycosuria for several days. A review of Carnot's researches seems to demonstrate the existence of an infectious pancreatitis which may account for some glycosurias following infections.

Although a complete discussion of the etiological relationship between diabetes and acute infections does not come within the

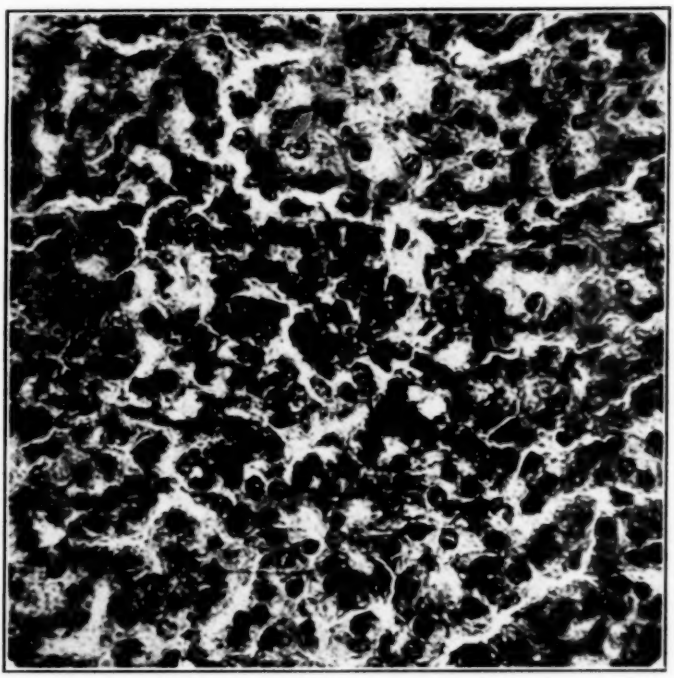

FIG. 4. Pancreas x 480. From glycosuria subject, showing degenerated intertubular cell mass, which was the largest in section, others being recognized with difficulty as being cell mass remnants. Hematoxylin and eosin.

confines of a short report, it should be borne in mind that infections causing diabetes, while apparently relatively uncommon, should not be overlooked.

It can readily be seen how a process such as necrotic enteritis, by virtue of intestinal and bacterial toxin elaboration and the anatomical relationship of the pancreas to the diseased intestine,

may bring about anatomical, chemical or physiological alterations in the pancreas.

Observations of necrotic enteritis groups will demonstrate that some advanced cases when placed in clean surroundings will live for long periods, although not show the proper gain in weight or condition. Upon autopsy such cases do not always present intestinal lesions severe enough to account entirely for their physical condition. There is little doubt but that the extreme intoxication present during advanced cases of necrotic enteritis leaves its impress upon various vital organs and that the pancreas may be one of these. Of course, it is realized that one case such as encountered by us might be a coincidence, but in view of the extensive literature in the human field, it is believed worthy of record, and encourages a more detailed laboratory examination in addition to the usual pathological and bacteriological procedures in the investigation of infectious diseases.

The possibility of diabetes being induced by an infection depends upon its action upon certain centers, the type of individual and tolerance. In other words a specific infection will not always produce a glycosuria.

Eczema with itching frequently accompanies diabetes. Various explanations as to the etiology of such eczema are given. Naunyn attributes the itching, similar to that in icterus and uremia, to the irritating action of the sugar-laden blood on the sensory nerve endings. The abstraction of water from the tissues by the high sugar content of the blood resulting in dryness and impaired nutrition are also given as factors responsible for the pruritus. The case cited by us showed very marked symptoms of itching, incessantly rubbing its sides against the walls of its enclosure. Parasitism was carefully eliminated. Microscopically the skin presented sebaceous glands which were smaller than normal, and heavy desquamating keratin strands.

Nothing specific can be said regarding the relation of the hepatic changes to the glycosuria in this case, but merely their presence noted. In the literature available it is conceded by some that hepatic changes such as hepatic congestion in suralimentation, toxic disturbances, or onset of hepatic cirrhosis may produce glycosuria as a result of their action on the glyco-regulator system.

Conclusions

1. The presence of glycosuria as high as 6.6% in a pig showing

intertubular cell mass (islands of Langerhans) degeneration and necrosis with hepatic lesions was noted.

2. Eczema was present, accompanied by pruritus with diminished size of sebaceous glands and heavy layers of desquamating keratin.

3. The determination of an approximately 10% sugar tolerance as compared with an apparently normal pig possessing a histologically normal pancreas was made.

4. The case under consideration may be one of diabetes induced by an infectious disease, in this instance, necrotic enteritis.

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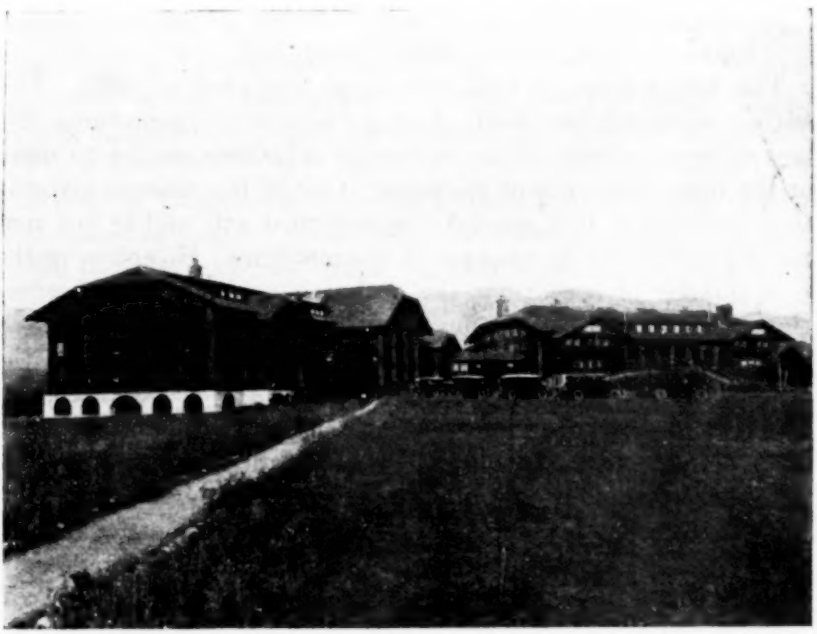
ON THE WAY TO PORTLAND



Glacier Park Hotel, at eastern entrance.

REVIEWS

LES MALADIES DU PORC (Diseases of Swine). G. Moussu, Professor at the Veterinary School, Alfort, and the National Institute of Agronomy. Second edition. 8vo, 290 pages, with 96 figures, of which 4 are in colors, in the text, and xii plates in three colors. Paris, France. Vigot Freres, 1924. Cloth, 20 fr.

It is said that the methods of swine raising, in France, have undergone very marked changes during recent years. Swine raising operations, on a small scale, are showing a tendency to disappear and to be replaced by operations on a much larger, so-called industrial scale. This involves great risks from disease unless these operations are directed by persons who fully understand the business. The breeding and raising of swine would be very remunerative if it were not for the outbreaks of disease which occur and upset calculations. The purpose of this book has been to present, in convenient form, the latest knowledge on the subject of swine husbandry (part 1), technic for the operations practiced on swine (part 2), and diseases of swine (part 3). The tri-colored chromotype plates are exceptionally well executed.

MANUEL D'OBSTETRIQUE VETERINAIRE. O. Lebrun. Second edition. 8vo, 176 pages, with 33 figures in the text. Paris, France. Vigot Freres, 1924. Paper, 8 fr.

The first edition of this little book appeared in 1903. The author acknowledges that, during the period intervening the two editions, obstetrics has not made advances similar to some of the other branches of medicine. One of the reasons given is that parturition is a normal, physiological act, and is not materially influenced by changes in surroundings. However, in the past quarter of a century, the author has made some observations and had the opportunity of applying some new methods in cases of difficult parturition, and these are described in the new chapters. The book is divided into four parts: (1) Preliminaries to intervention, including general considerations, conduct of the veterinarian when he is called, precautions which the veterinarian should take upon his arrival, the toilet of the operator, his attitude towards the persons present, obstetrical instruments. (2) Difficult parturitions. (3) Accidents of pregnancy. (4) Obstetrical operations, including cesarean section. (5) Postpartum accidents, including retention of the placenta.

ABSTRACTS

THALLIUM ALS ARZNEI UND ALS GIFT (Thallium as a Poison and a Remedy). Hugo Hartnack. Berliner Tierärztliche Wochenschrift, 1925, 4. (Author's abstract.)

The name "thallium" signifies "green," because its spectrum shows a conspicuously green line. Thallium is a metal similar to lead. It is found in small quantities in many ores throughout the world. It is obtained from the waste of such ores, and is also found in various mineral waters.

As a medicine, thallium acetate has been used to combat phthisical night-sweats and as a depilatory. Its anhidrotic effect is accompanied by alopecia and many other symptoms of poisoning. Used as a depilatory, it often causes epilation of the entire body. In experiments on animals as a depilatory, it was often not effective; rubbing it in on a small spot caused the death of the animal after a short time, but did not result in removing the hair on the rubbed surface. Without undergoing any diminution, thallium metal sterilizes the immediate neighborhood in which it is brought.

Poisoning by thallium is regarded as a poisoning of the endocrine system, because all the organs of the endocrine system are affected. The testicles sometimes disappear entirely; the calcium equivalent is disturbed; alopecia occurs. Small amounts applied over a considerable period have caused cataracts in the eyes.

The poisonous effects of thallium have been known since 1863. Particularly remarkable is the high toxicity of thallium. Death was caused in 2 rats, 4 guinea pigs, 4 rabbits, 6 toads, and 7 dogs, which together had been given less than three grams (45 grains) of the metal. Its cumulative effect, further, is remarkable. Thallium remains in the body three weeks. It does not make any difference if a deadly amount is given in one large dose or if the same toxic amount is given in five doses over a period of two weeks. The skin of the animal poisoned with thallium is dry; in other respects, there is a similarity between thallium and lead poisoning, except that with thallium there is no constipation or salivation.

The author thinks that many alopecias in animals, perhaps also affections of the eyes, especially periodic ophthalmia, could have their origin in thallium poisoning.

UNTERSUCHUNGEN AN DER LEBER UND MILZ BEI DER ASKARIDENANAMIE DES HUNDES (Investigations of the Liver and Spleen in Ascaris Anemia of Dogs). P. Tenambergen. Tierärztliche Rundschau, xxx (33), p. 527.

As a result of his work, the author comes to the following conclusions:

1. Ascarids have been described in the literature, as producing a severe anemia in man and animals.

2. In many of these cases of severe anemia, the formation of the corpuscular elements of the blood has been described in human medicine as occurring in the liver and spleen.

3. The observation of Seyderhelm that, in severe anemia, the destruction of the corpuscular elements by the ascarids, should not be received without further investigation.

4. I have observed, in ascariasis of the dog, high grade anemias which have given clinical symptoms.

4. In no cases have I observed formation of erythrocytes or leukocytes in the liver or spleen in these cases.

C. P. F.

CASSIUS WAY COMPANY EXPANDS

Announcement has been made that the Cassius Way Company has formed a Veterinary Zonite Division, for the purpose of placing before the veterinary profession a stabilized electrolytic sodium hypochlorite solution—Zonite—a greatly improved and concentrated form of the well-known Carrel-Dakin solution, used so extensively in wound treatment during the late war. Coming so closely after the announcements of taking over the marketing of Synergins and the distribution of Fort Dodge products in the East, this latest move marks the Cassius Way Company as one of the most progressive concerns in the field.

GOPHER HUNTERS KILL 20,000 DEER

It is estimated that 20,000 deer were killed in Minnesota during the 1924 hunting season. If so, that is as many deer as were killed in any other three states. The law in that state provides that the hunter must make a written report of his luck. At the last count, 13,488 hunters had reported killing a deer, and 8,013 were reported disappointed. Since the total of these represents only two-thirds of the licenses issued, it is estimated that about 20,000 deer were killed.

ARMY VETERINARY SERVICE

CHANGES RELATIVE TO VETERINARY OFFICERS

Regular Army

Captain F. H. K. Reynolds, V. C., from Army Medical School to temporary duty at Carlisle, Pa., for course at Medical Field Service School.

First Lieutenant Jack G. Fuller, V. C., Camp Lewis, Washington, to sail from San Francisco March 30th for duty in Philippine Department.

Captain Forrest R. Harsh, V. C., ordered to duty at Camp Lewis, Washington, on completion of his tour of foreign service.

Captain George L. Caldwell, V. C., relieved from duty with Remount Purchasing and Breeding Headquarters and directed to report to Commanding Officer at the Presidio of Monterey, Calif., for duty.

Captain Wm. R. Wolfe, V. C., reported for duty at Fort Sam Houston, Texas, February 21st from leave, following tour of duty in Hawaii.

Dr. Ernest Eugene Hodgson, Harleyville, Kansas, a graduate of Kansas State Agricultural College, 1924, was appointed 2nd Lieutenant in the Veterinary Corps of Regular Army on February 2, 1925, and ordered to report to the Medical Field Service School, Carlisle Barracks, Penn., for a four months' course of instruction.

Veterinary Reserve Corps

Additional Reserve Officers

Lieutenant Colonels:
- Bemis, Harold Edward.....822 Brookridge Ave., Ames, Iowa.
- Nelson, Nelson L.....212 W. 25th Street, Sioux Falls, S. D.

Majors:
- McKim, Orville Ernest.....425 Boston Post Road, Port Chester, N. Y.

Captains:
- Bohannon, Vincent D.....1313 18th Avenue, S. Nashville, Tenn.
- Earl, Warren B.....Univ. of Nevada, Reno, Nevada.
- Neal, Allan J.....324 Essex Street, Bangor, Maine.
- Morris, Chas. V.....361 Sterling Place, Brooklyn, N. Y.
- Nelson, Spencer K.....c/o Albert Lea Packing Company, Albert Lea, Minnesota.
- Robinson, Thomas E.....92 High Street, Westerly, R. I.
- Shore, Charles Bruce.....White Bear, Minnesota.
- Stryker, Lester H.....219 Monmouth St., Red Bank, N. J.
- Wilson, Frank Morse.....Mechanicsville, Iowa.
- Youngblood, Earl W.....Union City, Tenn.

First Lieutenants:
- Goodman, Albert A.....Norwood, Colorado.
- Welch, Guy Noble.....43 Union Street, Northfield, Vt.
- Wessels, George.....314 W. Mongtomery Street, Creston, Iowa.

Second Lieutenants:
- Conway, James Clifford.....New Goshen, Indiana.
- Coon, Elvin R.....133 State House, Indianapolis, Ind.
- Mason, Wm. Daniel.....1300 Central Ave., Chattanooga, Tenn.
- Seagraves, Charles H.....Astoria, Oregon.
- Wilson, Edward A.....P. O. Box 147, Hackettstown, N. J.

CHANGES IN STATUS

Promotions

Dorton, Joseph S., Lafayette Street, Shelby, N. C., promoted to 1st Lieutenant, Vet-ORC.

Leavitt, Charles H., 999 Cleveland Avenue, Portland, Oregon, promoted to 1st Lieutenant, Vet-ORC.

Seute, Wm. Herman, Box 382, Pleasanton, Kansas.

Friedline, Lloyd M., Jonesboro, Indiana, promoted to Major, Vet-ORC.

Separations

Haigh, Henry H., Captain, Vet-ORC, failed to accept reappointment.

Odou, Wm. D., Captain, Vet-ORC, failed to accept reappointment.

Talbert, Mellis G., 2nd Lieut. Vet-ORC, failed to accept reappointment.

GRADUATION EXERCISES—ARMY VETERINARY SCHOOL

The graduation exercises for the Army Medical, Veterinary, and Dental Schools, session of 1925, were held in the Red Cross House at the Army Medical Center, February 10, 1925, with appropriate ceremonies, including an address by the Surgeon General. The diplomas and medals were presented by Brigadier General Nolan, Deputy Chief of Staff. The following veterinary officers were graduated and, with the exception of Captain Santamaria, ordered to Carlisle Barracks, Pennsylvania, to take the course of instruction at the Medical Field Service School, beginning February 14:

Captains: F. H. K. Reynolds (honor graduate, Hoskins Medal), Harold E. Egan (honor graduate), Irby R. Pollard (honor graduate), Earl F. Long, James A. McCallum, Serafin Santamaria (Cuban Army), Louis L. Shook, Frank H. Woodruff. Second Lieutenants: Laurence R. Bower, Herbert M. Cox.

On completion of this course, the following officers will report for permanent duty as indicated: Captain Pollard to Ft. Sill, Oklahoma; Captain McCallum to Fort Snelling, Minnesota; Captain Woodruff to Fort Hoyle, Maryland; 2nd Lieut. Cox to Fort D. A. Russell, Wyoming; and 2nd Lieut. Laurence R. Bower to Fort Sam Houston, Texas.

HARD TIMES FOR HOG MEDICINE VENDORS

Vendors of stock remedies have found the going rather rough the past year, according to newspaper reports. One from Pittsfield, Ill., reads as follows:

The Illinois Hog Medicine Company one day last week paid Arthur Bauer the sum of $297.50, which was the full amount of the judgment awarded Bauer after a trial against the company in the Pike County circuit court. Bauer's action was based upon the fact that a number of his hogs died after he had fed them stock food purchased from the hog medicine company. Judge Higbee refused to grant the motion of the company for a new trial, and the company apparently concluded not to appeal the case.

Another, from Sioux City, Iowa, conveyed the following information.

Frank H. Marx of Cherokee, who states that he is a hotel employe, has filed a petition in bankruptcy. Marx places his debts at $4,421 and his assets at $1,503. He claimed $150 of his assets were exempt from seizure. Marx's financial troubles are said to have grown out of the Cherokee Stock Remedy Manufacturing Company, a trade name under which he operated a few years ago.

ASSOCIATION MEETINGS

PAN-PACIFIC FOOD CONSERVATION CONFERENCE

The first Pan-Pacific Food Conservation Conference was held at Honolulu, T. H., July 31 to August 14, 1924. The conference was organized with eight sections and sub-sections. Section 5 was devoted to animal industry. Professor L. A. Henke, of the University of Hawaii, acted as chairman, and Dr. C. O. Levine, of Canton Christian College, acted as secretary.

Monday afternoon, August 4, the Section on Animal Industry met in the Library of Hawaii. Animal diseases and quarantines were the chief topics discussed. Dr. G. Le Louet, Chief of the Plant and Animal Quarantine Service of Indo-China, presided and the following papers were presented:

"The Bacteriophage as an Agent of Vaccination against 'Barbone' Disease," by Dr. G. M. LeLouet, Chief, Pasteur Institute, Saigon, Indo-China.

"Animal Quarantine," prepared by the New South Wales Government Delegation and presented by Sir Joseph Carruthers, President of the Chamber of Agriculture, New South Wales.

"Bush Sickness," prepared by B. C. Aston, F. I. C., F. N. Z. Inst., and presented by Hon. George M. Thompson, Member of Legislative Council of New Zealand.

"Quarantine Regulations in the Far East," by Dr. Wu Lien Teh, Head Manchurian Plague Prevention Service, Peking, China.

"Notes on the Control of Rinderpest in Formosa," by Dr. Kintaro Oshima, Director, Dept. of Agriculture, Govt. Research Institute, Formosa.

"Mutual Understanding re Surveys of Animal and Plant Diseases and Parasites," prepared by the New South Wales Governjment Delegation and presented by Sir Joseph H. Carruthers, President of the Chamber of Agriculture, New South Wales.

"Sero-Infection as a Means of Vaccination against Rinderpest in Cochin-China," by Dr. G. M. Le Louet, Chief, Pasteur Institute, Saigon, Indo-China.

THIRD PAN-AMERICAN SCIENTIFIC CONGRESS

The third Pan-American Scientific Congress, together with the second Pan-American Women's Congress and the first Pan American Standardization Congress, met in Lima, Peru, convening for the first time on December 20, 1924, and continuing to January 6, 1925.

Twenty republics of the Americas were officially represented, the United States Government being represented by ten official delegates appointed by the State Department, and various societies being officially and unofficially represented by other scientific men and women.

The work of the Congress was divided in sections, those in which veterinarians were most interested being Medicine and

Biology, Agriculture and Zootechnics. The Section on Biology, Agriculture and Zootechnics met in the University of San Marcos, the oldest university in the Americas. There were very few papers on strictly veterinary subjects.

The first paper was by Dr. Mrowlsa, of the Chicama Valley, Peru, on "The Immunization against the Tocazon in the Valley of Chicama." (Tocazon is a kind of protozoan fever.) The doctor also made some remarks about renguera in cattle (an incoordination of movement in the hind legs). The Doctor's work was well thought out and original. It was given in Spanish, of course. He has a serum treatment which promises to be of value in the treatment of this disease as well as a preventive.

Dr. Tabusso, Professor of Veterinary Science in Lima, read a paper relative to the action, on animals, of smoke from mineral smelters. The Doctor also exhibited a series of microscopic preparations showing tissue alterations. This paper also was in Spanish, was well prepared and was evidently the result of a great deal of work and was of considerable local interest.

Col. R. J. Stordy, C. B. E., D. S. U., head of the Peruvian Government model farm at Chuquibambilla, gave a paper on breeding. The work done here on sheep, alpaca, and other animals, has been very well carried out and will undoubtedly lead to wonderful results if carried further. The staple of the alpaca fleece, in some prize animals, is two and one-half feet long and of very fine quality.

The writer, representing the Cerro de Pasco Copper Corporation, of Oroya, Peru, read a paper entitled, "Experiments in Metallurgical Poisoning of Animals at Oroya, Peru, Elevation 12,200 Feet," and followed it with a short discussion of renguera in sheep. The paper received some criticism, for the reason that it did not go into the effect of smoke on vegetation, but this question was out of the province of the paper. Renguera is a disease of sheep in the Peruvian highlands characterized by an incoordination of the muscles of the hind legs. This disease, I have found by experiments, can be cured by use of mercurochrome; iron, quinin, and strychnin citrate; and Fowler's solution given intravenously. The cause of renguera in sheep is not yet known, but this disease has not been produced by feeding large quantities of arsenic, lead oxid and flue dust, the latter being the cause advanced here by the owners of the neighboring haciendas.

Articles on many subjects were read in the Section on Medicine,

much stress being put on quarantine and eradication work being carried on in the different countries with tropical and semi-tropical diseases. One of the best of these papers was presented by Dr. Rodolfo A. Bonzone, of the Argentine Army. It describes work on the eradication of hook worms, typhus and other diseases.

The papers on agricultural subjects, plant propagation, plant diseases and insect pests, show that there is a great deal of interesting work being done and to be done in this vast continent. The papers on mining and engineering subjects were of great interest. (This was really an engineers' congress.) Some rather amazing propositions and discoveries were put forth. The electrification of many projects was discussed. Railroads and their standardization gave rise to several papers. Some quite remarkable map work is being done in Argentina and Uruguay.

Education came in for much discussion. Among other things a Pan-American university is being recommended for Panama and a Pan-American secondary school at Washington, D. C. A special Pan-American institute for electrical engineers was recommended; special emphasis to be put on electrical power as a public utility. One hundred forty-seven recommendations were adopted and signed by twenty of the American republics.

The social functions that brought entertainment and beauty to the Congress were new, colorful and of absorbing interest to all of us who were privileged to attend. Spanish hospitality is akin to that of our own Southern United States, and a pleasure to us all. To describe all of the numerous banquets, teas, balls and fiestas would take a great deal of space. Suffice it to say that the Spanish señorita, in or out of costume, is charming and vivacious; and the señor is a caballero indeed.

The Congress, as a whole, was a success, in that it brought the countries together for a discussion of our mutual interests and plans to overcome our differences of opinion.

The next place of meeting will be San Jose, Costa Rica, in 1929. The third Pan American Conference of Women will be held simultaneously under the auspices of the Scientific Congress at the same place.

JAMES F. MITCHELL,
Corresponding Secretary for Peru.

SANGAMON VALLEY VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Sangamon Valley (Ill.) Veterinary Medical Association was held at Springfield, Ill., January 3, 1925.

Drs. F. A. Laird, state veterinarian, and I. B. Boughton, of the University of Illinois, discussed the poultry disease prevalent in parts of the Central West. Dr. R. S. Houghton, newly appointed county veterinarian, discussed tuberculosis eradication.

Officers for the year were elected as follows: Dr. C. E. Hammonds, Girard, president; Dr. C. M. Merriman, Mt. Pulaski, vice-president; Dr. C. A. Van Ausdall, Edinburg, secretary-treasurer.

NEVADA STATE VETERINARY ASSOCIATION

The 1925 annual meeting of the Nevada State Veterinary Association was held in Reno, January 22, 1925. The meeting was called to order by President N. E. Nielson, in the Agricultural Building, University of Nevada, at 2 p. m.

Dr. W. H. Hilts gave a general talk on foot-and-mouth disease, followed by a discussion led by Dr. L. C. Butterfield and contributed to by Dr. Robert Dill, Dr. W. C. Dye and other members present. A paper on alkali poisoning was read by Dr. E. M. Dobbs and discussed by the author and various other members present. Several of the members rendered case and experience reports which were discussed generally by those present.

The meeting then adjourned for the Association dinner, which was held at the Hotel Golden, twelve members and four guests being seated. The literary program was resumed at 8 p. m. Dr. W. H. Boynton, of the University of California, gave a very interesting talk, profusely illustrated with lantern slides, dealing with his work in the Philippine Islands, on rinderpest and its control and some other interesting features of Island life.

Dr. R. A. Given was elected president; Dr. E. S. Glace, vice-president, and Dr. Edward Records re-elected secretary-treasurer of the Association for the ensuing year.

EDWARD RECORDS, *Secretary.*

MICHIGAN AGRICULTURAL COLLEGE VETERINARY SHORT COURSE

There were thirty graduate veterinarians registered, and twenty present who did not register, at the second post-graduate short course for veterinarians at Michigan Agricultural College,

January 26-30, 1925. A definite class-room schedule was maintained and the following subjects discussed:

Animal parasites, animal nutrition, including a consideration of vitamins, care of new-born calves, mineral nutrition in cattle, endocrinology; also a consideration of heredity, breeding problems and abortion, and the autopsies and surgical clinic. Finally considerable attention was paid to poultry sanitation and poultry diseases.

Aside from the resident members of the faculties of the Veterinary, Agricultural and Science divisions of the College, there were on the teaching staff representatives from the State Department of Agriculture, the United States Bureau of Animal Industry, and from the Detroit Board of Health.

Dr. H. H. Sparhawk, with the assistance of Doctors Bates and Gordon, of the Detroit Board of Health, conducted a conference on the extension of meat inspection into the smaller cities of Michigan.

Dr. D. H. Udall, from the Cornell faculty, was the mainstay of the program and testimony from every quarter was to the effect that much benefit was derived from his part on the program.

Dr. L. H. Smith, of the Detroit Creamery Company's Ingleside Farm, probably the largest dairy farm in the eastern states, contributed helpfully to the discussion of abortion and sterility. Dr. H. S. Raffensperger came from Chicago to present the results of the "exit ascaris" campaign. Dr. H. M. Newton, of the B. A. I., Lansing, gave an interesting running talk on his personal experiences in foot-and-mouth disease eradication, while the very excellent movie was being shown.

The features of Clinic Day were the autopsies by Dr. L. N. Sholl and the demonstrations by Doctors Hutton and Sales, including the placing of cases for operative surgery at the disposal of the visiting veterinarians. Interesting colored lantern slides of the new poultry disease, presumably European fowl plague, were shown by Dr. S. R. Johnson, of the State Department of Agriculture. We had the pleasure of hearing a discussion on life histories of some parasites by Dr. Alexander Kotlan, of the Royal Hungarian Veterinary College, Budapest. Dr. Kotlan is Visiting Professor for the year at the Veterinary Division at M. A. C.

Space will not permit details as to all the participants and all the features of this short course. Suffice to say, the Post-Graduate Short Course for Veterinarians has come to stay. Such

courses are meeting a real need, and that in a very satisfactory way. Through these short courses any practitioner or veterinary worker in any field should be able to keep abreast of the times.

W. G.

WISCONSIN VETERINARY MEDICAL ASSOCIATION AND SHORT COURSE FOR VETERINARIANS

On Tuesday, January 27, 1925, the Wisconsin Veterinary Medical Association convened at the Park Hotel, Madison, for the tenth annual meeting of the Association in conjunction with the third annual short course for Wisconsin veterinarians, at the University of Wisconsin. The first two days were devoted to association business and the presentation of a carefully planned program by practitioners. Interesting discussions followed each paper. The program committee and contributors are to be commended on their excellent work. The titles of the papers presented and the authors were as follows:

"A New Disease of Feeder Lambs," C. F. Hannemann; Diseases of New-born Calves," C. F. Schlotthauer; "An Obscure Disease of Horses," Lyle West; "Report on the Recent Foot-and-Mouth Disease Outbreak," J. F. Purcell; "Dog Practice from an Urban Practitioner's Standpoint," C. A. Deadman; "Some Udder Troubles of Cows," T. H. Ferguson; "Area Testing from a Rural Practitioner's Standpoint," W. F. Nolechek; "Lip and Leg Ulceration of Sheep," J. Ehlenfeldt.

The banquet on Wednesday night was an especially enjoyable affair. Exactly 110 plates were laid around the festive board. This large number attests to the popularity of this feature. Dr. J. S. Healy was master of ceremonies. Of the many interesting talks, that given by Hon. J. D. Jones, Commmissioner of Agriculture, was especially well received.

On January 29, the strictly educational part of the program was staged at the College of Agriculture. The forenoon was devoted to two demonstrations; the first by Dr. B. A. Beach, of the University, who demonstrated the tuberculin testing of hogs and chickens; the second by Dr. H. S. Murphey, of Iowa State College, who ably explained the physiology of the oestrus or genital cycle of the cow, using fresh specimens for demonstration. He emphasized the importance of learning the normal, or physiologic, phenomena of the reproductive organs before attempting to treat pathologic changes.

Other features of the short course program included the following: "Markets for Wisconsin Dairy Cattle," A. O. Collentine, Extension Animal Husbandman; "Some Causes of Losses in Baby Chicks," J. G. Halpin, Professor of Poultry Husbandry; "Sunlight as a Therapeutic Agent" (illustrated), H. Steenbock, Professor of Agricultural Chemistry; "The Microscopic Examination of Sperm Cells (practicum), Drs. F. B. Hadley and E. M. Gildow; "General Therapeutic Principles" (illustrated), A. S. Loevenhart, Professor of Pharmacology and Toxicology; "Some Unanswered Questions about the Tuberculin Test," E. G. Hastings, Professor of Agricultural Bacteriology.

Professor J. G. Halpin's paper brought out important facts regarding the value of sunlight in the control of leg weakness, stating that sunlight, which has passed through window glass, has had the ultraviolet rays filtered out, and is, therefore, ineffective as an anti-rachitic agent. Dr. H. Steenbock exploded the old theory of mineral deficiency as a cause of rachitis and emphasized sunlight as the "essential element" in the therapy of this disease.

The short course program was concluded at 9:00 p. m. All present felt that this day was most profitably spent and sincerely hope that the University will continue these annual short courses indefinitely. Contributors to the program are to be congratulated on the results of their efforts.

The surgical and medical clinic, held at Dr. J. P. West's veterinary hospital on the morning of January 30, concluded the convention.

The following officers were elected for the year 1925: President, J. P. West, Madison; vice-president, Thos. Wrigglesworth, Eau Claire; secretary, O. H. Eliason, Madison; treasurer, W. L. Richards, Morrisonville; trustee for three years, R. S. Heer, Platteville. It was voted to accept with thanks the invitation from Dr. Wrigglesworth to hold the summer meeting in Eau Claire.

C. F. SCHLOTTHAUER, *Reporter.*

SOUTH DAKOTA VETERINARY MEDICAL ASSOCIATION

The annual meeting of the South Dakota Veterinary Medical Association was held in the Cataract Hotel, Sioux Falls, January 28-29, 1925. The stormy weather that prevailed two or three

days before the beginning of the meeting drifted many of the country roads to such an extent that automobile traffic was impossible. This resulted in a smaller attendance at the opening of the first session than usual, but before the meeting had progressed very far, the attendance was up to standard. Many of the veterinarians who planned on driving to the meeting were obliged to go on trains, consequently their arrival was somwehat late.

The meetings of the Association have been very well attended, and the program of excellent character during the past few years. The program this year was fully equal to those presented in the past, and was highly profitable to all in attendance. The evening of the first day, a banquet was served the members of the Association, their wives and visitors, by the various biological firms doing business in South Dakota. The banquet was enjoyed by a larger number of veterinarians and friends this year than on any previous year. A splendid program of jokes was prepared that added to the enjoyment of the evening.

Many members of the Association had prominent places on the program in the reading of papers and the discussion of the various subjects presented. This latter feature of the Association work is being encouraged and the results this year indicate that considerable progress is being made. Several of the outstanding features of the program were the papers presented by veterinarians from other states.

Dr. L. A. Merillat, President of the A. V. M. A., presented a very able talk in which he stressed the fact that there is but one veterinary profession, of which all veterinarians are members, and to which they owe loyalty and allegiance, not only for their progress and success but for the success and progress of the profession at large and the live stock owners as well.

Dr. R. R. Dykstra, Dean of the Division of Veterinary Medicine of the Kansas State Agricultural College, was the next speaker from out of the state. He presented an illustratiod lecture on "Medical and Surgical Review," in which he presented a number of the most recent medical and surgical developments. The charts illustrating Dr. Dykstra's paper emphasized and clarified the various points brought out.

Dr. H. C. H. Kernkamp, of University Farm, St. Paul, presented an able paper on "Posterior Paralysis in Swine." This paper outlined the results of an extended series of experiments

with which Dr. Kernkamp was connected. Much new light was shed on this somewhat obscure condition by the author.

Dr. C. E. Salsbery, of Kansas City, presented a paper on "Anthrax Aggressin," in which he outlined the results of an extensive series of experiments designed to investigate the possibilities of producing a new product for the immunization of animals against anthrax. A large number of tables and charts accompanied Dr. Salsbery's paper, which served to elucidate the experimental work done.

Dr. E. A. Gregory, pathologist in several of the Sioux Falls hospitals, presented a paper on "The Relationship of Animal Diseases to Human Medicine." In this paper Dr. Gregory pointed out many of the connections between animal and human diseases, and the significance that should be attached to them.

All of the papers and discussions were received with the greatest of interest and attention, and it was the unanimous opinion of all the members in attendance that this was one of the best meetings ever held in the state.

The following officers were elected for the ensuing year: President, Dr. J. F. McFarland, Plankinton; vice-president, Dr. George Faber, Mitchell; secretary-treasurer, Dr. C. C. Lipp, Brookings.

C. C. Lipp, *Secretary.*

ALABAMA SHORT COURSE FOR GRADUATE VETERINARIANS

The second annual short course for graduate veterinarians of Alabama was held at the College of Veterinary Medicine of the Alabama Polytechnic Institute, at Auburn, Feb. 2-7, 1925.

Veterinarians from practically all of the southeastern states grasped the opportunity and were in attendance. Many more veterinarians would have attended the short course but for the fact that there was a steady down-pour of rain during the first day or two and many of the highways were almost impassable.

The opening address was given by Dean C. A. Cary, who, in his characteristic manner, detailed the purpose of the short course, and outlined the program for the week. Lectures and demonstrations were given continuously from 8 a. m. until 9 p. m., excepting for brief recesses for lunch and dinner. Dr. J. C. Flynn, of Kansas City, Mo., gave several lectures on the diseases of dogs and cats. The Doctor gave a detailed descrip-

tion of a modern small animal hospital and demonstrated his ideas by a moving picture of his hospital, in which were depicted the construction and management of a small animal hospital and methods of control of small animals, as well as medicinal and surgical treatment.

Ample clinical material was available and typical cases of rabies, hook worm infestation, constipation, and many other cases were presented and many surgical cases, such as sutureless oöphorectomy, trimming tails, ablation of tumors and applying plaster of Paris casts were demonstrated. Practically all of the veterinarians were intensely interested in small animal practice.

Dr. B. F. Kaupp, poultry expert from the A. & M. College of North Carolina, gave several lectures on poultry management and infectious and parasitic diseases of chickens. The Doctor stressed the necessity of providing a proper ration and sanitary surroundings for poultry. He gave a detailed discussion of the European fowl pest and the differential diagnosis of related diseases, such as fowl cholera, fowl typhoid and broncho-pneumonia. The important parasitic diseases of poultry were discussed and the sources of infestation, methods of control and treatment were given in detail.

Dr. Peter F. Bahnsen, state veterinarian of Georgia, gave several valuable demonstrations of restraint of horses and mules. The Doctor demonstrated that it was possible to restrain any horse or mule, single-handed, for practically any operation. It was universally conceded that Dr. Bahnsen is an expert, not only in spell-binding an audience oratorically, but also in his ability to restrain treacherous and unbroken horses and mules.

Dr. A. T. Kinsley, of Kansas City, Mo., lectured on swine management and the diseases of swine. These lectures were well taken and when the southern farmers produce more swine the veterinairans will be better equipped to prevent losses and make swine production profitable.

Many valuable lectures and demonstrations were given by members of the college faculty. Dean Cary demonstrated a modern city abattoir and discussed the value of an efficient municipal meat inspection. Dr. F. D. Patterson demonstrated the visceral anatomy of fowls and the technic for making a complete autopsy. Dr. I. S. McAdory demonstrated the visceral anatomy of the dog and the generative organs of the cow and discussed methods for the control of sterility.

Dr. R. S. Sugg gave a detailed description of collection,

packing and shipping specimens for laboratory diagnosis and discussed the value of a laboratory diagnosis.

Dr. N. G. Covington gave excellent demonstrations of making a complete autopsy. The Doctor has a splendid technic and is a past master in exposing every gland and organ in a remarkably short time. His demonstrations were not only interesting but also impressive and instructive.

The College of Veterinary Medicine of the Alabama Polytechnic Institute is well arranged and equipped not only to educate young men in veterinary science, but also to give graduate veterinarians a splendid short course, and the short course in February, 1925, was a success and a credit not only to Dr. Cary and his co-workers, but also to the profession.

A. T. KINSLEY, *Reporter.*

KANSAS VETERINARY MEDICAL ASSOCIATION

The combined program of the twenty-first annual meeting of the Kansas Veterinary Medical Association and the fourth annual Conference for Kansas Veterinarians was held in Manhattan, Kansas, Feb. 4-5-6, 1925, The meeting was held in the veterinary buildings at the State Agricultural College, which offered the best of facilities for the literary and clinical programs. There was an attendance of 150 members and visitors and they all expressed themselves of having a very instructive meeting.

The Association was called to order by the president, Dr. H. C. Gale, of Howard. Dr. R. R. Dykstra, Dean of the Division of Veterinary Medicine, welcomed the veterinarians to the institution. He pointed out the duties of the veterinarian in relation to his local vicinity, bearing in mind at all times that our standing in our home vicinity reflected not only upon ourselves but upon the profession as a whole. Another point brought out by Dean Dykstra was that of advertising the veterinary profession through its individual members by way of their social and business gatherings.

One of the best pieces of oratory was delivered by Dr. E. F. Kubin, secretary of the State Board of Examiners, in his response to the address of welcome. I am sure that every member of the Association would have enjoyed listening to Dr. Kubin much longer than they did had only time permitted. We will remember this splendid address and hope to hear from him in the future.

The president's annual address, by Dr. H. C. Gale, contained

much food for thought and incidentally he prophesied a bright future for the veterinary profession. All present enjoyed Dr. L. A. Merillat's address concerning the American Veterinary Medical Association and its purpose. Kansas veterinarians are always glad of the opportunity to hear and meet with Dr. Merillat.

A large portion of the afternoon was given to Dr. John W. Adams, of the University of Pennsylvania, for his discussion on "Approved Methods of Diagnosing Common Affections of the Horse." Dr. Adams demonstrated his lecture by using specimens from the Riding School of Fort Riley. When Dr. Adams completes a subject there generally is not much left to discuss, as he covers it so thoroughly.

Dr. H. F. Lienhardt presented a very able paper, as the Doctor always does: "Diagnosis of Skin Affections of Domesticated Animals." This paper was very interesting and instructive to practitioners present. The subject of "White Diarrhea in Chickens and Its Control" was presented by Dr. W. R. Hinshaw, of the Department of Bacteriology.

The entire evening was used by Dr. S. L. Stewart in presenting his illustrated lecture on "Retained Placenta, Its Handling and Sequelae." This was a very interesting piece of work and was presented to the Association in a splendid manner. Dr. Stewart spent many hours preparing this subject and deserves much credit for his accomplishment.

Thursday morning Dr. J. H. Burt gave an interesting demonstration and interpretation of some blood and urine tests. This is one subject that the veterinary profession as a whole is lame upon and our Association should dwell upon such subjects more often. Perhaps one of the most interesting numbers of the morning program was a question box on "Parasites and Parasitic Diseases," by Dr. Maurice C. Hall. The entire membership present took part in asking questions concerning parasitology and Dr. Hall discussed them in the easy and instructive way that he always does. Much information was obtained from this presentation.

Major R. J. Foster, of Fort Riley, gave a very able demonstration and lecture on army riding horses. It was here that many of us began to realize how scarce the "typy" army horse is. More interest should be given this type of horse, as the demand is greatly exceeding the supply and we predict a real price for them in the future. Dr. R. D. Bushnell, of the Department of Bacteriology, gave a very good paper on "Pertinent Facts

Regarding Immunology." Professors Fitch and Jay, of the College, gave talks relative to "The Dairy Situation in Kansas and Dairy Inspection and Sanitation."

Friday morning, Drs. Frick and Bullard, of the clinical staff, gave a demonstration on "Physical Examination of Cattle." Drs. Kitselman and Scott gave in detail, "Recent Investigations of Abortion and Blackleg."

A business session was held and the following officers were elected for the ensuing year: President, Dr. I. J. Pierson, of Lawrence; vice-president, Dr. R. C. Foulk, of Holton; secretary-treasurer, Dr. Chas. W. Bower, of Topeka; member of Executive Board, Dr. A. H. Gish, of Eldorado. Topeka was unanimously chosen for the next meeting in 1926.

The meeting closed with a varied clinic consisting of demonstrations and operations on dead formalin-treated subjects and on live animals including cattle, horses, swine, poultry and dogs.

CHAS. W. BOWER, *Secretary.*

ONTARIO VETERINARY ASSOCIATION

The winter meeting of the Ontario Veterinary Association was held in the Prince George Hotel, Toronto, February 12, 1925. This was one of the most successful meetings ever held by the Association. Not only were the papers read and the addresses given of high order, but the discussion which took place relative to these subjects was constructive and valuable as well. The meeting was well attended, and keen interest on the part of those present was manifest throughout.

President Dunn, of Barrie, Ontario, called the meeting to order at 10 a. m., and the business of the Association was concluded in a short time. Dr. H. H. Ross, editor and manager of the *Canadian Veterinary Record*, gave a report on the standing of this publication, and an appeal was made to assist in obtaining more subscriptions. The meeting then adjourned to 1:30 p.m.

The afternoon session was taken up in addresses and discussions as follows:

"Poultry Diseases," by Dr. Ronald Gwatkin, Ontario Veterinary College.
"Canine Dystokia," by Dr. J. A. Campbell.
"Milk Inspection and Its Relation to the Veterinarian," by Dr. J. A. Laurie.
"Pulmonary Emphysema in the Bovine," by Dr. J. C. Brown.
"Traumatic Pericarditis," by Dr. H. M. LeGard.
"Rumenotomy," by Dr. R. Devereux.
"Sterility in Cows," discussion on different phases, by Drs. Caley, Page and McIntosh.

Meeting adjourned to 7 p. m., when a banquet was held for social intercourse.

Guests of honor for the evening, occupying the central table, were: Dr. C. D. McGilvray, Principal of the Ontario Veterinary College; General Gunn, of Gunn's (Limited) Packing House, Toronto; Mr. S. E. Todd, Secretary, Industrial and Development Council of Canadian Meat Packers; Dr. J. A. Amyot, Deputy Minister of Health, Ottawa; Dr. H. H. Ross; Dr. J. Dunn; and Secretary Dr. James Glover; representatives from Swift's Canadian plant and the Harris abattoirs were also present.

After-dinner addresses were given as follows:

"The Place of the Veterinarian in Public Health Work," by Dr. A. R. B. Richmond, in charge of Food and Milk Inspection for Toronto.
"The Relation of the Veterinarian to the Meat Packer," by General Gunn.
"The Bacon Industry and Hog Grading," by Mr. S. E. Todd.
"Diseases of Animals Communicable to Man," by Dr. J. A. Amyot.

At the conclusion of the meeting, every member present expressed himself as being highly pleased with the meeting and the arrangement of the program.

R. A. McIntosh, *Resident Sec. for Ontario.*

NATIONAL ASSOCIATION OF BUREAU OF ANIMAL INDUSTRY VETERINARIANS—MISSISSIPPI VALLEY DIVISION

The regular meeting of the National Association of Bureau of Animal Industry Veterinarians—Mississippi Valley Division, was held at the Federal Building, East St. Louis, Ill., February 14, 1925 at 7:30 p. m. The minutes of the previous meeting were read and accepted. Various communications in regard to retirement were read and acted upon.

Dr. L. C. Stewart read a paper on the late foot-and-mouth disease campaign in California, and told us of the various methods used in eradicating this disease.

Dr. G. H. Bruns read a paper on and gave an exhibition of cysticercosis in cattle, which was followed by a general discussion.

The next in order was election of officers for the coming year, and the following members were elected: Dr. G. H. Bruns, president; Dr. S. L. Blount, vice-president; Dr. R. E. Surring, secretary-treasurer.

A motion then was made to adjourn to meet again in St. Louis Missouri, at the Federal Building, May 9, 1925, at 7:30 p. m.

R. E. Surring, *Secretary.*

TIPPECANOE VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Tippecanoe Veterinary Medical Association was held at the Veterinary Department, Purdue University, LaFayette, Ind., February 10, 1925. The program included discussions on fowl pest, hog feeding, contagious abortion and several other subjects. A clinical demonstration followed a luncheon, served in the Veterinary Building. Dr. R. F. Smith, of Boswell, was elected president and Dr. G. H. Roberts, of LaFayette, was re-elected secretary-treasurer.

It was decided, at this meeting, that the Tippecanoe Association would be the host at a meeting to be held in July, to which all the veterinarians of Indiana, with their wives, would be invited, this meeting to be held at Purdue University. At this time old acquaintances may be renewed and a closer relation established between the veterinarians of the state.

NORTHWESTERN OHIO VETERINARY MEDICAL ASSOCIATION

The nineteenth annual meeting of the Northwestern Ohio Veterinary Medical Association was held at the Waldorf Hotel, Toledo, on Lincoln's Birthday, February 12, 1925. This organization was established at Wauseon, Ohio, in 1907, and has held two meetings each year since its founding. The membership is composed almost entirely of veterinarians engaged in general practice in Ohio and Southern Michigan. The present membership is 150 and there were about 125 in attendance at the Toledo meeting which, I believe, was the most successful in recent years.

The program included the following:

Suggestions for Small Animal Practice," Dr. Harry T. Moss, Dayton.

"Diagnosis of Pregnancy in the Cow," Dr. D. M. Swinehart, Columbus.

"A Disease of the Fowl Caused by a Filtrable Virus," Dr. A. Broerman, Reynoldsburg.

"The Founding of this Association," Dr. A. J. Kline, Wauseon.

"Our Legal Problems," Dr. F. A. Zimmer, Columbus.

"Opposition to Tuberculin Testing in Ohio," Dr. A. J. DeFossett, Columbus.

A question box was conducted by Dr. W. F. Wise, of Medina.

The Association, by unanimous vote, adopted a resolution asking the College of Veterinary Medicine of the Ohio State University to offer a special course of instruction for Ohio veterinarians of at least three days duration, in January or February, 1926, similar to the second annual Post-Graduate Short Course

for Veterinarians conducted by the Division of Veterinary Science of the Michigan Agricultural College, in cooperation with the various federal, state and municipal departments, January 26-30, 1925. This resolution was presented by Dr. H. E. Ash, of Bowling Green, who attended the Michigan Short Course and was enthusiastic in his praise of it.

Dr. Reuben Hilty, of Toledo, made the local arrangements for the meeting, and had 100 seated about the tables for the luncheon. Dr. John B. McQuown, of Ada, invited the Association to go to Ada and the Ohio Northwestern University for the summer meeting. Unless we are obliged to alter the date, we will meet in Ada, Thursday, July 30, 1925.

During the past year we have increased our membership 20 per cent and increased the attendance at our meetings about 50 per cent. We have done so by using the best local men we could persuade to go on the program, rather than "imported" men from a great distance. The result has been that every practitioner will reflexly participate in the meetings—he will ask and say what he thinks and does not stand in awe of the speaker. The discussions, the frank exchange of ideas and practices have really "made" our Association take on a new light.

Officers elected for 1925 are: President, Dr. W. F. Wise, Medina; vice-president, Dr. Fred A. Zimmer, Columbus; secretary-treasurer, Dr. F. A. Lambert, Columbus.

F. A. LAMBERT, *Secretary.*

CONESTOGA VETERINARY CLUB

The Conestoga Veterinary Club of Pennsylvania held its third regular monthly meeting of the year at the Stevens House, Lancaster, Pa., March 12, 1925.

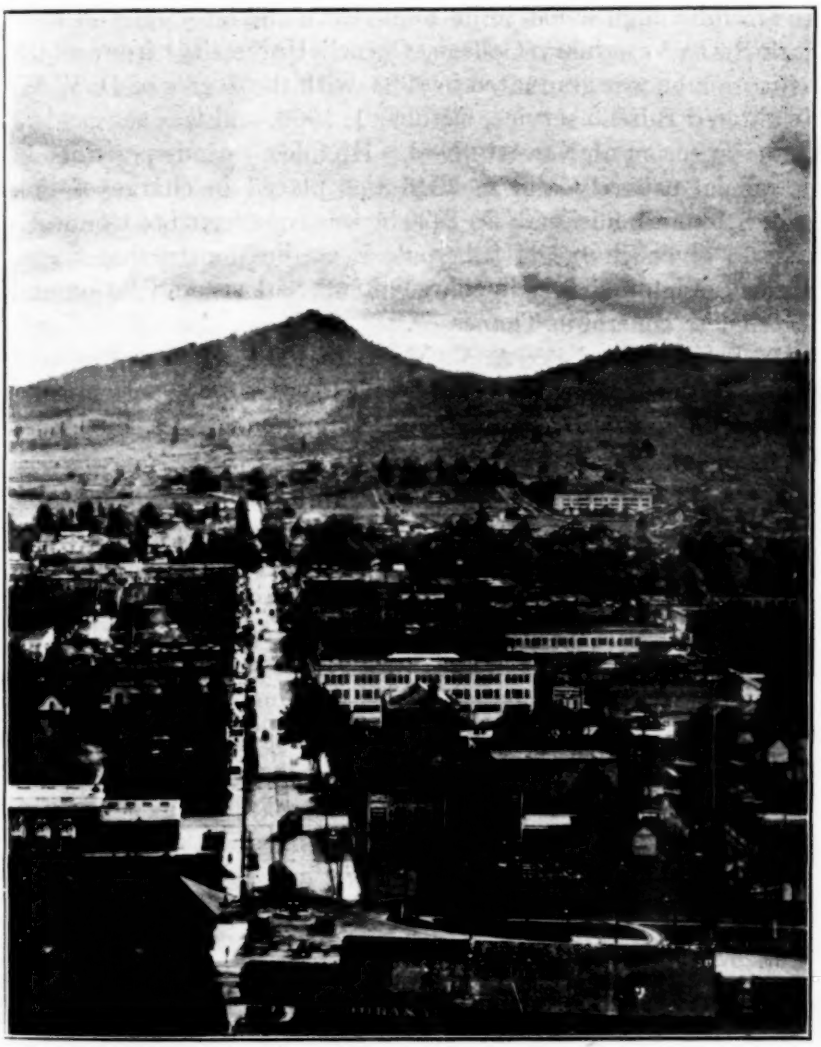
Dr. C. J. Marshall, of the University of Pennsylvania, delivered a highly instructive lecture on "The Diseases of the Genital Tract," confining himself to actual cases as recorded on a card index system which he inaugurated three years ago in a Pennsylvania herd of 250 dairy cattle. He also explained the working details of the system and the many advantages of its adoption. Dr. Marshall's lecture was one of a series given by the University of Pennsylvania Veterinary Extension School and was followed by a general discussion.

The meeting was called to order by Dr. Joseph Johnson, president pro tem. Mr. John Hegeman, of the Pitman-Moore

Company, was a welcome visitor and the following members were present: Drs. H. W. Barnard, J. R. Bender, H. W. Bender, H. Brady, B. P. Chodos, E. P. Clark, E. L. Cornman, F. U. Fernsler, R. C. Gross, J. J. Johnson, J. G. Leber, E. W. Newcomer, C. V. Peace, H. S. Weber and Eustis Seamon.

HENRY S. WEBER, *Secretary.*

ON THE WAY TO PORTLAND



Old view of Eugene, Oregon, taken from Skinner's Butte.

Eugene is located on the Pacific Paved Highway, 123 miles south of Portland, a convenient stop for any members driving to Portland. Dr. E. R. Derflinger, one of our members, is located at Eugene.

NECROLOGY

E. I. SMITH

The death of Dr. E. I. Smith, Bureau inspector in charge of tuberculosis eradication and hog cholera control in Tennessee, on February 18, 1925, at Nashville, Tenn., came as a shock to his many friends in private and official life. He suffered a stroke of apoplexy two days previously, from which he did not rally.

Dr. Smith was born at Randolph, N. Y., November 11, 1874. He attended high school in his home town and later entered New York State Veterinary College, Cornell University, from which institution he was graduated in 1903, with the degree of D. V. M. He entered Bureau service, October 1, 1906, and was assigned to meat inspection at Newark, N. J. He filled various positions in his official capacity and in 1916 was placed in charge of tick eradication in Louisiana. In 1920 he was transferred to Connecticut and given charge of tuberculosis eradication in that State. His last assignment was in charge of tuberculosis eradication and hog cholera control in Tennessee.

Dr. Smith joined the A. V. M. A. in 1916 and was Resident Secretary for Louisiana, 1916-20. He was very active as a member of the local committee on arrangements for the A. V. M. A. meeting in New Orleans, in 1919.

In the discharge of his duties Dr. Smith displayed intelligence and good judgment. His genial personality endeared him to all with whom he came into contact, and his zeal in the application of public work, together with his tact in dealing with fellow employes and the general public, made him a valuable employe to the Government.

Dr. Smith is survived by a wife and one daughter. They accompanied the remains to Randolph, New York, where the funeral took place.

From Eternity he answered the call,
As we shall, you and I,
They took him away in a bier and pall,
As they will, you and I.
He left this vale for his long, long rest,
To match his deeds with the Master's test,
Safe in knowledge that he'd done his best,
As we should, you and I.

E. E. SAYERS

Dr. E. E. Sayers, of Algona, Iowa, died at his home, February 20, 1925, following a long illness. Dr. Sayers had not been in vigorous health for some years, as a result of an injury sustained in the active practice of his profession. Last year he suffered a paralytic stroke, from which he never recovered.

Born on a farm near Edison, Ohio, Dr. Sayers was the oldest of six children. He is survived by two brothers, Dr. R. C. Sayers, Fairfield, Iowa, and D. B. Sayers, a civil engineer, of Columbus, Ohio. He was in his sixty-first year. The remains were taken to his old home in Ohio, where interment was made on Feb. 24.

Dr. Sayers was graduated from the Veterinary Department of Iowa State College, in 1885, and at once located at Algona, where he soon established a large and lucrative practice. He was well known throughout the State and the Central West, both among the members of the veterinary profession and the general public. He was a modest, retiring man of the highest character and noted for his fairness, honesty and ability.

Always keenly interested in the progress and new developments made in veterinary medicine, Dr. Sayers was quick to see whether or not there was virtue in any new proposition. For example, he was among the first of those engaged in actual practice to recognize the benefits that would follow the general use of anti-hog cholera serum, and from the first was a strong supporter of the campaign to eradicate tuberculosis and, as long as he was able, was active in his support of this campaign and any other question he believed was right.

Dr. Sayers' ability was early recognized by officials of the state of Iowa and he served as Assistant State Veterinarian from the time of Governor Larrabee's administration. He quietly reached a decision on points that he believed were for the general good and then fearlessly stood for his convictions. For many years he was a member of the Animal Health Commission of the State and retained this office until the Commission was discharged at the time of the creation of the present Department of Agriculture in the State. He was a member of the State Examining Board up to the time of his death.

The people of Iowa, and particularly the members of the profession he loved so well, have lost a true friend and adviser.

H. J. S.

THOMAS FRASER

Dr. Thomas Fraser, of Richmond, Va., died at his home, March 10, 1925. He had not been in good health for some time.

A native of Scotland, Dr. Fraser located in Richmond immediately upon his graduation from the Ontario Veterinary College, in 1901, and soon became a leader in the profession of Virginia.

Dr. Fraser joined the A. V. M. A. in 1912 and at the time of his death was Resident Secretary for Virginia, a post he had held for several years. He was a member and ex-president of the Virginia State Veterinary Medical Association, and secretary of the Virginia State Board of Veterinary Medical Examiners. Dr. Fraser was a 32nd degree Mason, being past master of Amity Lodge No. 76, Scottish Rite, and a member of the board of the Masonic Home for Orphans.

He is survived by his widow, two sisters and two brothers.

EDGAR L. OLSON

Dr. Edgar L. Olson, of Renville, Minn., died at the U. S. Government Hospital, National Home, Milwaukee, Wis., December 21, 1924.

Born at Renville, Minn., March 7, 1897, the deceased attended high school and later the McKillip Veterinary College, having been graduated in 1920. While in the army he contracted tuberculosis and during recent years was under treatment in several hospitals.

Dr. Olson joined the A. V. M. A. in 1922, while at Fort Whipple, Prescott, Arizona. He was licensed to practice in South Dakota.

WILLIAM OWEN WEBSTER

Dr. Wm. O. Webster, of Utica, Ohio, died January 20, 1925, as the result of injuries received when his car was struck by a train near Utica. His six-year-old son, Harold, who was riding with him, also died, shortly after his father.

The deceased, who was in his 55th year, was a graduate of the McKillip Veterinary College, class of 1914. He joined the A. V. M. A. in 1915. Dr. Webster is survived by his widow, three children, his mother, three sisters and three brothers.

MARRIAGES

Dr. James H. Foley to Miss Velma H. Miller, both of Stuart, Nebr., Jan. 1, 1925.

Dr. H. J. Rollins (K. C. V. C. '16), of Rockingham, N. C., to Miss Jamis H. Cole, of Washington, D. C., Jan. 14, 1925, at Washington, D. C.

BIRTHS

To Dr. and Mrs. A. W. Ewing, of Morrisville, Mo., a son, Arthur Winston, Junior, December 25, 1924.

To Dr. and Mrs. D. R. Philp, of Mankato, Minn., a son, David Robert, Feb. 5, 1925.

PERSONALS

Dr. L. G. Pottle (K. C. V. C. '08) is a member of the Board of Aldermen, of Quincy, Ill.

Dr. A. E. Stettler (O. S. U. '16), of Columbus Grove, Ohio, is president of the Local Exchange Club.

Dr. A. A. Goodman (Col. '15), of Norwood, Colo., is secretary of the San Miguel Basin Fair Association.

Dr. T. P. Woolf (Ala. '10), formerly of Crichton, Ala., is now at the Kilby Dairy Farms, Montgomery, Ala.

Dr. Harry Jones (Chi. '94), has moved from Deer Lodge, Mont., to Missoula, same state. Address: P. O. Box 84.

Dr. W. A. Anderson (K. C. V. C. '07), of Sleepy Eye, Minn., holds the position of Dairy Inspector for his city.

Dr. M. M. Leonard (N. Y. S. V. C. '14), of Asheville, N. C., conducts a pet shop in connection with his practice.

Dr. A. H. Alcorn (Chi. 04), of Atlantic, Iowa, was recently kicked by a horse, which resulted in a broken right leg.

Dr. H. B. Treman (McK. '01), of Rockwell City, Iowa, has been compelled to relinquish practice on account of poor health.

Dr. Jos G. Beattie (K. C. V. C. '05), of North Portland, Ore., represents the Denver Hog Serum Company in his territory.

Dr. F. H. Austin (Cin. '18), formerly of Clifftop, W. Va., is now located in Huntington, W. Va. Address: 2915 Third Ave.

Dr. E. M. Dobbs (Corn. '16), formerly located at Las Vegas, Nevada, is not at Berkeley, Calif. Address: 1244 Euclid Ave.

Dr. T. O. Keller (McK. '12), of Peru, Ind., has announced his candidacy for the office of Mayor at the spring primaries to be held in May.

Dr. A. N. Metcalfe (R. C. V. S.), formerly of Moore, Pa., is assisting Dr. Cheston M. Hoskins (U. P. '11), of Philadelphia, in his practice.

Dr. Robert Fisher (Chi. '06), city milk and meat inspector of Paducah, Ky., was the principal speaker at a farmers' short course recently held at Sharpe, Ky.

Dr. Ellsworth S. Brown (Corn. '22), has resigned his position with the Department of Health, Albany, N. Y., to enter practice at Canandaigua, N. Y.

Dr. M. L. Boevers (Iowa '24), who has been located at the University of Kentucky, Lexington, moved to Birmingham, Ala., March 1. Address, 2117 Avenue A.

Dr. Ward Giltner (Corn. '06), Dean of the Division of Veterinary Science, Michigan Agricultural College, delivered an address before the Pomona, Mich., Grange, February 18.

Dr. P. H. Browning (Chi. '03), Territorial Veterinarian of Hawaii, was a delegate to the Pan-Pacific Food Conservation Conference, held in Honolulu, Hawaii, July 31 to August 14, 1924.

Dr. E. R. Frank (K. S. A. C. '24), has been appointed to the vacancy on the staff of the Division of Animal Pathology, at the University of Illinois, caused by the resignation of Dr. Boughton.

Dr. Dyar C. Wood (K. C. V. C. '18), of Greensburg, Ind., addressed the forty-fourth annual meeting of the Indiana Jersey Cattle Club, at Indianapolis, Feb. 27, 1925. The subject was "Sterility."

Dr. Robert Graham (Iowa '10), who has been in Haiti for the past year, organizing animal disease control work for the republic, will return to his post at the University of Illinois in the near future.

Dr. J. R. Beach (Corn. '13), of the University of California, was a recent visitor in Ithaca, Philadelphia, Washington, and other points in the East, in connection with studies of European fowl plague.

Dr. G. C. Bevan (Ala. '15), of Bellevue, Iowa, who has been assisting Dr. J. H. McLeod (McGill '94), in tuberculosis eradication work, has been appointed veterinary inspector for Cedar County, with headquarters at Tipton.

Dr. J. F. Mitchell (Corn. '11), A. V. M. A. Corresponding Secretary for Peru, represented Cornell University and the A. V. M. A. at the third Pan-American Scientific Congress, held at Lima, Peru, December 20, 1924, to January 6, 1925.

Dr. D. H. Udall (Corn. '01), Editor of the Cornell Veterinarian, has received a request from one of the leading German veterinary publications for the use of the half-tones used in the October, 1924, issue. Evidently, the work is considered of sufficient importance to warrant reprinting in a European journal.

Dr. I. B. Boughton (O. S. U. '16), who has been acting head of the Division of Animal Pathology, at the University of Illinois, during the absence of Dr. Graham, has resigned his position to accept the appointment of Director of the Veterinary Science Department of the Republic of Haiti. He will take up his new duties May 1.

Dr. A. R. Theobald (O. S. U. '24) resigned his position as Dairy Food and Sanitary Inspector for the Belmont County (Ohio) Board of Health, March 1, and has taken possession of the Blue Cross Dog Hospital, at 3934 Ludlow Avenue, Cincinnati, formerly operated by Dr. F. O'Flaherty (Cin. '20), who is planning to study human medicine.

Dr. C. W. Lassen (McK. '06), is proprietor of Lassen's Service Station and Auto Park, at Pendleton, Oregon. Dr. Lassen calls attention to the fact that Pendleton is only 230 miles from Portland and just a nice one-day ride. Veterinarians who contemplate driving to the A. V. M. A. meeting at Portland should plan to stop at Pendleton for a visit with Dr. Lassen.